# *Gender Differences in Learning Achievement in Eritrean Secondary Schools With Emphasis on Science*

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## *Abstract*

Women constitute about 50% of the population in any given society. Realisation of this fact has led many a leader in the developing world to declare that there will be 'no development without women'. In the era of globalisation, science and technology are increasingly believed to hold the important keys to national development almost any where in our rapidly shrinking global village. In Eritrea science and technology are widely believed to unlock the country's resources so as to improve the living conditions of the people. Yet in spite of this alleged importance of science, girls in Eritrean secondary schools are under-performing in science subjects. This can be substantiated by the fact that for example, of the 8,368 candidates in 1999 who sat for the ESECE only 34.23% (or 2,864) were females. Of the later only 8% were admitted to the University of Asmara as compared to about 20% of their male counter parts.

The above inequalities and the desire to know what prevents girls from achieving academically especially in the field of science are what lead the undertaking of this study. In an attempt to understand the nature of barriers and how these operate at the secondary school level, the study asked several questions some of which were; Why does achievement in boys and girls in Eritrea increase as their ages and grades increase? What factors affect Eritrean secondary school boys and girls achievement in science? To what extent are pupils' attitude and confidence to learning science subjects affected by gender? This study therefore sets out to examine the various factors affecting gender difference in science achievement in Eritrean secondary schools by focusing on out of school and in-school factors.

Broadly, this study employed quantitative and qualitative approaches, i.e. by survey questionnaire and semi-structured interview methods and the target population was secondary school science teachers, directors, pupils, their parents and university students.

The findings indicate that the wider society in Eritrea does not feel science is important for women's life. This finding, what is more, appears to be mirrored by the ethos of the secondary school and the stereotypical views of girls' achievement in the area of science. Therefore, causes for poor attainment of girls in science include; lack of motivation on the sides of the girls, expectation of girls' early marriage, teachers' discrimination of girls in science classes and competing demands on girls' time. At these and other similar other barriers mentioned in the study have social-cultural and pedagogical implications and the study offers various recommendations.

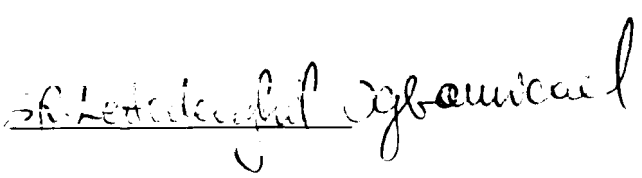
***Dedication***

*To all*
*Eritrean youth*
*especially*
*secondary school pupils*
*and*
*university students.*

***Authors' declaration***

I declare that the work in this dissertation was carried out in accordance with the regulations of the University of Bristol. The work is original except where indicated by the special references in the text.

Any views expressed in the dissertation are those of the author and in no way represent those of the University of Bristol. The dissertation has not been presented to any other university for examination either in the United Kingdom or overseas.

Signature: 

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## *Abbreviations*

| | |
|---|---|
| ESECE | Eritrean secondary education certificate examinations |
| ETS | Educational testing services |
| IAEP | International assessment educational progress |
| FEMSA | Female education in mathematics and science in Africa |
| SPSS | Statistical package for social sciences |
| OFSTED | Office for standards in education |
| TTI | Teacher training institute |
| WGFP | Working groups of females participation |
| VSO | Voluntary services overseas |

## *Part One*

## *Chapter One*

### *1. Introduction*

The aim of this study is to identify factors affecting gender differences in learning achievement in Eritrean secondary schools, especially in the area of science. The study also serves to analyse the effects of stereotypical attitudes of the society, which may negatively affect pupils' academic performance. This study reflects upon a number of relevant and interrelated fields of knowledge, which include theories of motivation, school effectiveness and classroom interaction.

The study sets out to investigate Eritrean secondary school directors', teachers', pupils', parents' and university students' perceptions of the inequitable distribution of educational benefits between males and females, as well as the causes and consequences of such inequalities. Hence, it is conducted on Ertireans of various ages and ethnic-backgrounds. The empirical research sites for this study are in four out of the six administrative zones i.e., Debub (Dekemhare), Gash-Barka (Barentu), Anseba (Keren) and Maekel (Asmara). The school types are four state and two private comprehensive secondary schools.

This study attempts to collect fundamental data about Eritrean secondary school pupils' achievement as it affects boys and girls and explores causes of the differences in achievement between boys and girls. Hence it seeks to investigate the extent to which the beliefs, assumptions and theories, which learners, teachers and parents bring to school affect pupils' academic achievement. The aim is to focus on raising awareness of these issues in teachers, parents and (to some extent) the society at large, with a view to encourage secondary school pupils (particularly girls) to improve performance in science.

## *2. The research questions and aims*

1. *Why does the achievement gap in Eritrean secondary school boys and girls increase as their ages and grades increase?*
2. *What factors produce the difference in boys' and girls' academic performance in Eritrean secondary schools, especially, in science?*
3. *To what extent are pupils' attitude and confidence in learning science subjects, and their consequent success affected by gender?*
4. *What part do teachers' attitudes play in the performance of girls in sciences?*
5. *Is there a relationship between parental educational level and the child's achievement?*
6. *Do parents generally expect less of their daughters than of their sons in science education?*
7. *Does Eritrean society encourage boys and girls to achieve in secondary education, especially in the area of science?*

The aims of this study are:

1. *To explore reasons for gender disparities in achievement in Eritrean secondary science,*
2. *To identify Eritrean pupils', particularly girls' constraints in science learning*

### 2.1 Research Hypothesis

The hypothesis for this study is based on the extent to which a person desiring to do well influences his/her individual activities, and consequently the degree of success. Of course, as (Howe 1999: 14) points out, all learners wish to succeed and most make an effort to attain their goals. However, there is substantial difference among individuals in the strength of their achievement motivation. Pupils with high self-esteem may study hard to obtain good results and the good results in return may reinforce their self-esteem; pupils with low self-esteem on the other hand, may lack confidence to challenge their potentials, thus study less and consequently under-perform.

My understanding is that most Eritrean girls lack self-confidence and motivation to study hard to achieve good results in higher education, especially in the area of science. Low self-esteem, can be the result of cultural and social values learned and assimilated from society by the learners. Girls' low self-esteem and under-estimation of their ability to achieve academically are seen as the probable reasons for the disparity in Eritrean secondary schools. Hence, my hypothesis for girls' poor performance in science education are:

1. *Low motivation and encouragement (from the society at large, their parents and secondary school teachers), to academically achieve,*

2. *Eritrean girls develop low self-esteem due to their encounter with repeated academic failure or vice versa, hence do not study enough,*
3. *Girls underestimate their potential to succeed in science,*
4. *Examination types, which are mostly multiple choices in nature are not favourable for females,*

## *3. Background to the study*

Much attention has been given to studies on gender and education in the last twenty-five years or so. Unfortunately, most of these studies are focused on western countries. Comparatively, as (Wamahiu 1996, P. 55) points out, little research on gender difference in the classroom has been conducted in Africa. However, what has been done points towards implicit and explicit gender discrimination in the classroom. Wamahiu further says that research portrays girls in educational classrooms, especially in science classrooms, as displaying passive, quiet and subservient behaviour. Unfortunately, these seem to portray similar perceptions to what prevails in Eritrea.

Some studies exist on gender and education in developing countries also. For example, the Working Group of Female Participation (WGFP), which was created in 1990 to help close the gender gap in African school enrolment, attainment, and performance, (Gender Review Jan-March 2001). Others include: Girls' mathematics, science & technology education in Kenya (Kioko, 1996); Interventions for the promotion of girls' education in Tanzania (Bendera, 1997); Gender difference in Kenya's formal education system (Otunga, 1998), and (Swainson 1995). However, not enough of these studies have been undertaken from African perspectives and much less from Eritrean perspectives.

In the last few years some small scale studies such as those listed below took place also in the country. These are:

- *Education wastage ... Preparatory work to improve basic education for girls in Eritrea, 1995, (Asmara: Ministry of Education)*
- *Women and Education in Eritrea..., (Stifanos, 1997),*
- *Needs assessment of female students at the University of Asmara, 1998, (Female faculty..., University of Asmara),*
- *A Ph.D. thesis on Socio-linguistic construction and maintenance of girls' and boys' identity in 2 urban schools in Eritrea, (Ogbay, 1999).*

Most of these studies reveal that girls are generally found to under-perform in almost all subjects. These studies give valuable information about the actual situation and argue that educating females is beneficial both to the individuals themselves as well as to the

society at large. However, no measures have yet been taken to adapt the education system to better meet the needs of both boys and girls.

Males and females in Eritrean society live different realities in terms of division of labour, access to opportunities in the life of education, political participation and decision making. However, although they live different realities, pupils are assessed in isolation from the daily cultural experience of the individuals. Often the learners are seen just as males and females in relation to their academic achievement. Given the different realities males and females live, it would be unfair to expect girls and boys to attain similar results. Therefore, this study will treats the gender identity formation process as a very important role in the formation of the individuals.

Boys and girls supposedly have equal chances of receiving education in the new Eritrea but due to the different treatment that they receive at home and in the classrooms, they attain different academic results. However, despite the different experiences that boys and girls live by, they are expected to attain equal results. In accord with (Riley 1994: 24), I would like to say that a common experience for boys and girls in the classroom as well as outside it may be necessary, but not sufficient condition for obtaining equal results are created in our secondary schools. Moreover, even though there may be many positive consequences in attending co-educational secondary schools, based on my personal experience and on several research studies, e.g. (Head 1996), (Hana et al. 1986), and (Deem 1984), I suggest opening of single sex schooling, since co-educational secondary schools can have negative effects on girls' academic achievement and on their social development. I will come back to this part later on in the thesis, where I will share my educational upbringing.

Concerns on gender equality and 'education for all' have existed in Eritrea, since the-mid 1970s, in the time of the armed struggle for independence and continue to the present day. The promotion of educational rights to all children has been an important cornerstone in the macro-policy of the Eritrean government, (Education for all p. 23). Accordingly the government has given top priority to education. Since independence (1991), most educational indicators have shown yearly improvements in the general standard of education. This has also contributed to the increasing number of pupils enrolled. Nevertheless, despite the increasing enrolments, according to the Ministry of Education yearly statistical reports and Eritrea Profile 9/9/98, girls continue to be

dramatically under-represented in achievement. Moreover, although there are substantial differences in male and female pupils' experience in secondary school science subjects, not enough is known about how Eritrea's general population. interpret these differences. This study therefore, explored accounts of Eritrean youths and adults on this significant theme.

### 3.1 Personal experience

Fundamental obstacles to girls' higher education in Eritrea were and to a certain extent still are embodied in societal views and practices. These determine that girls' only goals are to prepare for and to succeed in getting married. In the past the formal education of females was seen as an unnecessary burden, or worse still, a costly distraction as Asgedet Sifanos (1997: 666) rightly argues.

Concerning the concept of 'costly distraction', I too have an experience I could share, which expresses the point indicated above. The concept can be exemplified by the following incident. When I reached school age, I was able to go to a school in the village and completed first and second grades. At the time the village school stopped only at second grade level, in which I had either to interrupt or go to another village to continue with my education. My parents, therefore, decided to let me go to the nearest village, Sesah, which took about two hours to reach and another two hours to come back. Besides the long walking distance, I was the only girl among older boys, who could walk or run faster than myself, to arrive in school on time. At this point my parents got concerned and decided to transfer me to yet another school, in Dekemhare, where I could stay with an aunt and attend a school without having to walk very long distances.

On the day my father was walking me to the new school, we encountered an elderly man of our acquaintance, who asked where we were going. My father responded by saying: "*I am transferring my daughter to a new school where she can continue her education*". At this, the man reacted with astonishment and wondered at what seemed a senseless waste of time and energy in taking a little girl to school and engaged with my father in a heated debate. Now it is possible to say that the Eritrean society has come a long way from that exceeding and conservative attitude concerning girls' education, yet the fact remains that there are not many female students and teachers in higher education in the country.

In the 1970s, when I was a secondary school pupil, it was possible to predict which pupils would be able to pass the national standard exams successfully. Although not all, the majority of those who attended private and single-sex schools where individual pupils' progress was monitored regularly by the teachers, were the ones who passed those exams. However, it would be unfair to say that teachers' regular monitoring of pupils was the only factor for the pupils achievement, since families who chose to send their children to private schools were usually committed to making their children achieve good results.

Nonetheless, the presence of private and state schools created the spirit of competition both for the pupils and the teachers in their respective subjects and they worked harder to obtain good results. Unfortunately, that kind of spirit of competition does not prevail anymore. It is argued here that this is because of two major reasons. First, single-sex schools are non-existent and the current private schools are too few and too weak to produce competition and high academic achievers. Second, teachers in present day Eritrea, cannot monitor their individual pupils' progress because, they teach too many and too large classes.

### 3.2 Reasons for the choice of the topic

- *The choice for this topic stems from my own professional experience, as an instructor of pedagogy at the University of Asmara and an assessor of the work of student teachers in practice, in Eritrean secondary schools.*

- *The significance of the topic cannot be under estimated. If the problem is ignored, it is both the females as individuals, as well as the nation at large, which loses from their ability to contribute to science, technology, economy and the national development.*

- *The problems of girls' lack of achievement in science cannot wait to be resolved. It is urgent, hence, it must be addressed urgently. Moreover, the country is in need of future scientists to transform the nation. But if the majority of its secondary school pupils are not learning their science subjects appropriately and are continuing to fail at the rate that they are, then it is the nation which is failing, because they are its present and future resources.*

- *Since independence, only 11-14% of the candidates have been successful in obtaining acceptable results to join the University. The subjects which pupils find most difficult are usually Mathematics and Science. However, despite the exam results, the number of candidates wanting to join the university has increased in recent years.*

- *I feel that my being a female and Eritrean, i.e. my having an insider view, will help me produce balanced outcomes.*

### 3.3. Science Education

Science affects every one in one way or another; thus, it is necessary for every one to be helped to develop an interest in it. Furthermore, science is a recognised human experience, which provides a broad and deep perspective on human conditions and the world in which we live. In agreement with the view of Ankanah (1995, p. 49), I maintain that the value of science can be diminished if it is viewed in isolation from other areas of human experience.

In Eritrea some progress has been made in the area of science development relating to the rationale for the study and education for all. For example, the limited contribution of women to scientific and technological development has been underlined and reported regularly. However, despite all these, Eritrea has not mobilised policy and practice with the determination needed to solve a problem of this magnitude. Experience show that, even though girls' capabilities equal those of boys, many (girls) choose to turn away from the sciences for numerous conscious and unconscious reasons. These form a focus for this study.

The reasons behind turning way from the sciences may be that the job of scientists are un-accessible and incompatible with the typical woman's daily life in society. Women in Eritrea care for the family responsibilities almost single handed. Even though men may be the main breadwinners, some wives are employed outside of the home and work as many hours as the husbands, but when they come home, the women are expected to do all the house chores alone. That is they prepare the meal, do the washing-up, or tend to children' needs, while the husbands socialise with friends, read the newspaper, watch TV, or just relax.

## *4. Overview of Research design (Methodology)*

This section outlines the design of the study and the choices made regarding the broad approach and techniques of data collection. The details of the methodological rationale and the full research design are presented in chapter four. The methodology and procedures adopted are shaped by the nature of the research questions, the scope and

aims of the study. In this respect, the methodology is based on the administration of questionnaires and semi-structured interviews thus, quantitative and qualitative strategies, and document analysis are employed.

The questionnaires in this study were set to obtain insights from the participants and the semi-structured interview questions were prepared as a kind of follow up and checking the responses to the questionnaires. Therefore, the basic method of inquiry was the administration of questionnaires followed by the set of interviews. A cross-section of directors, teachers, pupils, parents and university students provided the main focus for the questionnaires process. The interview data was gathered from pupils, teachers and parents.

### 4.1 Criteria for sites and subjects' selection

Geographical distribution was the main reason for the selection of the schools which were situated in four out of six zonal locations and were representative of diverse school types and ethnic groups. The main features of the school sites were; public and private comprehensive secondary schools with pupils of mixed: ability, economical background and parental education background.

The people selected to participate in the study were:

- *Secondary school directors*
- *Eritrean secondary school science teachers present in the schools where the study took place*
- *$10^{th}$ and $11^{th}$ grade pupils, who were in the science departments*
- *Parents whose children were in secondary schools at the time of the study*
- *University students, who were in the science departments when they were in secondary schools.*

The reason why the different groups where included in the study is to enrich the data and to compare their views on the issue in discussion.

## *5. Notes about the study*

This research took place shortly after a national survey research on the State of High Schools in Eritrea had taken place [Ogubazghi & Holmes (Eds.) 1998]. However, as the document was not yet compiled and available at the launch of my study, I was unaware of its existence. Therefore, although the scopes of the two studies are different, there is an overlap of items in some of the pupils' and the teachers' questionnaires, and not surprisingly, almost all the common questions received similar responses.

Director's responses were analysed and integrated in the study but not presented in a particular chapter as the other participants.

Sex is the biological difference between males and females universally accepted, however, manhood or womanhood differs from culture to culture. The concept gender has been used to distinguish these differences, Otunga (1998: 27). Consequently, gender includes all the socially given attributes, roles, and activities connected to being a male or female. Hence, the terms gender and sex, as well as male/female and boy/girl, will be used interchangeably in this thesis and, to avoid exposing the names of the state schools they are coded 1, 2, 3 & 4.

Given the paucity of reference books in Eritrea, the chapters on the literature review and the chapter on methodology contain some descriptive accounts, which in the eyes of the researcher at this end, may appear superfluous. But they are incorporated in these chapters with the intention of serving as reference for future study by the author and/or other Eritrean researchers.

### *6. Structure of the study*

This thesis is divided into ten chapters

***Chapter one,*** is an introduction to the thesis and it is subdivided into sections. The sections include: the research question, background to the study, overview of the research design and structure of the study.

***Chapter two*** consists of an international literature review. This includes review of post-structuralist and feminist post-structuralist theories, childhood socialisation as it pertains to in school and out of school factors, factors affecting attitude and interest towards learning and achievement. This review focuses on the different learning and teaching styles, which affect pupils' interest and motivation to achieve good results. It also identifies the key issues, which have specific bearing in the Eritrean context.

***Chapter three*** focuses on the contextual background of the study, Eritrea. It gives a brief history of the country and the history of its educational development. This includes the review of the historical development of formal education, which started in

the time of colonialism, expanded in the time of Ethiopian occupation and developed even further in the present time (in the new Eritrea). This chapter also describes what an Eritrean school looks like and finally outlines the nature of the present education system and the policy of the new nation.

***Chapter four*** focuses on the methodological rationale for the study. This chapter outlines and justifies the research design from both a philosophical (methodological) and logistical (technique) perspective and explains their various functions while pointing out the approaches used in conducting the current research project. It also discusses the research procedures, the strategy used, the instruments of the study, the sampling criteria and procedures, its validity, reliability and the ethical issues considered.

***Chapter five*** presents secondary school pupils' views presented in different sections, which are: general information about the participants' background, their home environment, their home activities and their school life in general and discusses about gender and learning. Other parts include pupils' view on secondary science curriculum and its effect on gender and education.

***Chapter six*** analyses the data obtained from the University students. This chapter has four sub-sections which are: general information about the students' background, their views on gender and education, their views on secondary school science curriculum and the national standard exams.

***Chapter seven*** is an analysis of the teachers' questionnaires and interviews. This includes general information about the teachers' educational background and their teaching experience, their views on the teaching/learning process, the current science curriculum, the effects of secondary science education on girls and the evaluation and assessment of their pupils.

***Chapter eight*** analyses parents' questionnaires and interview responses. This chapter includes, parental involvement, their views of the current science curriculum, their assessment of the secondary school teachers and their views as to how secondary school age children are treated by the society.

***Chapter nine*** draws on all the data and interpretation. It compares the responses of all participants and presents it in summary form.

***Chapter ten*** provides the general concluding remarks of the study and recommendations.

## *7. Summary*

The study sets out to investigate Eritrean secondary school directors', teachers', pupils', parents' and university students' perceptions of the inequitable distribution of educational benefits between males and females, as well as the causes and consequences of such inequalities. The aim for this study is to identify factors affecting gender differences in academic achievement in Eritrean secondary schools, especially in the area of science.

The basic methods of research were quantitative and qualitative and the main features of the school sites were public and private comprehensive secondary schools. Although there are substantial differences in male and female pupils' experience in secondary school science subjects, not enough is known about how Eritrea's general population, interpret these differences. Having identified and clarified the issues to be researched and the research methods selected, we will now move to chapter two, the content of the study, (the literature review).

*Part Two*

*Chapter Two*

*1. Literature Review*

## 1.1 Introduction

This chapter aims at reviewing some of the major and most recent literature on gender differences in secondary school achievement, with a focus on science education. As there were gaps in the local literature, this study covers a wide range of international literature (form the West and the Developing Countries) on the subject of inquiry and examines the consequences of poor attainment in science subjects. A subsidiary reason is the acute shortage of pertinent literature on the theme under discussion. In this chapter debates about gender differences are considered and related to learning outside and inside schools. The term science in this study refers to the three science subjects taught in Eritrean secondary schools, which are biology, chemistry and physics.

The objectives of this chapter are:

- *To obtain relevant and most recent information on the issue in discussion;*
- *To learn about the factors causing gender disparity of achievement in secondary education (especially in the area of science).*
- *To find answers to the research questions*

## 1.2 A loss of potential talent & contribution to the nation

It is increasingly being recognised that men and women may bring different strengths and limitations to the generation of knowledge. However, science has been dominated for too long by a male mode of thinking, which can and at times, does affect the choice of problems to be investigated. The potential of women to contribute in all the spheres of national development cannot be disputed, (Zesaguli 1997). However, currently women are not participating fully in the various social, economical, political and educational spheres in Eritrea. The shortfall of girls in science and technology is already a well-recorded problem but not enough is being done to resolve it.

At a time when gender-equity is a celebrated issue in many parts of the world, it is unsettling to acknowledge that gender difference in science achievement in Eritrea persists. The small number of females who study science in secondary education and

beyond, the low representation of women in scientific and technological careers, and the lower levels of female interest and achievement in science have generated several questions in my mind and have tries to find the answers why. Researchers from the UK, e.g. (Parker, et al. 1996: 143) have tried to respond to similar inquest as indicated above and have found that the conspicuous gender differences in science and mathematics, are essentially due to physiological factors. However, I prefer the views of (Harding 1992), and Ashcroft et al. 1996), also from the UK, which tend to agree that the observed gender differences are due to culturally imposed stereotypes or that cultural/social relations are more important, rather than the physiological explanations indicated above.

In regard to the issue of women's potential contribution to science and technology, (Harding 1992: 2), has this to say:

> *If women are as potentially able as men to contribute to science and technology, then national development which, depends on applications of science and technology, will be limited through the operation of a science barrier to women. Therefore, it is a loss of talents to the nation. Secondly, women, themselves, suffer discrimination barriers, which prevent them from operating within science and technology. ... Thirdly, a barrier leads to a sense of alienation from science and technology among women. ... Fourthly, if women are not as fully involved as men are, there is a loss to science.*

Al though these findings are from the UK, and hence reflect a different situation, I feel that they relate to the situation of the present Eritrea. Evidence indicates, that there is under-representation in science achievement of females (see tables in chapter three and exam records in appendix, 5). The assumptions for these under-representation, are many, however, there seems to be no convincing evidence that girls are genetically less able than boys to achieve good results in science. On the other hand, many of them (girls) certainly have an un-favourable attitude towards science. Therefore, in accord with (Whyte 1984: 1), I maintain the relevant factors, which lead to girls' poor academic attainment are: sociological, psychological and cognitive in nature. Besides, they could comprise, the attitude of teachers, the teaching-learning methods used, the nature of curricula and examination types, which affect boys and girls differently.

Although there is little that can be done to alter many of the factors indicated above, it may be possible to provide a stimulating environment during the early formative years. Unfortunately, progress in this area too is limited. As (Parker et al. 1996: 134) rightly argue, these have their roots in the gender-related expectations of parents and teachers.

which in turn foster stereotypic attitude and gender role standards in children and adolescents.

### *2. Post-structuralist and feminist post-structuralist theories*

Post-structuralism was a response to the perceived deterministic aspects of structuralism. Post-structuralism is a concept drawn partly from a French Philosopher named Michele Foucault. Post-structuralism according to (Kenway et al. 1994: 189), is a theory applied to a very loosely connected set of ideas about meaning, the way in which meaning is created, the way it circulates amongst people, the impact it has on human subjects, and finally, the connections between meaning and power. In post-structuralism, meaning is not fixed in languages, in cultural symbols or in consistent power relationships. It shifts as different linguistic, institutional, cultural, and social factors come together in various ways. Meaning is influenced by and influences shifting patterns of power, and finally, it constitutes human subjectivity, which is regarded as shifting, many faces and contradictory. In the end, post-structuralism calls attention to the particular rather than the general, to discontinuity and instability rather than to continuity and stability, to plurality, diversity and difference, rather than to similarity and commonality and to the complexity rather than to essence of things. Its views of meaning make problematic notion of truth and call for individual models of subjectivities.

In this theory psychologists, sociologists and educational researchers in cultural studies have tried to show how institutions, practices and even the individual human subjects themselves can be understood as produced through the works of a set of discourses. Discourses, as (Mauthner & Hey 1999: 71) explain, are ways of thinking and talking about the world which are informed and directed by the play of power, creating and setting limits to the truths, by which people live and understand it. I value these views because they demonstrate the multiple positioning of femininity, which correspond to a multiplicity of subjectivities in the public and private worlds as workers, consumers, mothers, girlfriends and sisters. Mauthner and Hey argue that there is a need to specify the different practices in which different subject positions and power relations are played out.

In the context of education post-stucturalists, (Davies 1989), (Walkerdine 1981) and

(Davies and Banks 1992) emphasise the various and contradictory discourse of feminine subjects and a range of ways in which girls can be girls. Being a girl in educational settings, then, takes on various possible meanings, which shift within discoursive contexts or within different sets of taken for granted meanings. The possibilities for girls are both limited by the dominant conceptions of femaleness and also variable in so far as those conceptions differ, (Jones 1993: 159). So within an educational setting, which emphasises particular feminine decorum in its conception of girls, boisterous girls may be positioned as tomboys, naughty, or difficult. It also means that both boys and girls are displaying femininity and masculinity. In other environments where physicality is encouraged, these same girls will be positioned quite differently, may be as admirably competent. Or more importantly in the Eritrean context where females are associated with being talkative so to avoid such a reputation they try to speak down even when it is important to speak up, e.g. they avoid active participation in a classroom.

Furthermore, this theory reflects that, in their daily lives, girls may engage several meanings or positioning simultaneously, and they may take themselves up in contradictory positionings. For example, a girl may be very assertive and independent in some situations, and also be very sensitive to and easily controlled by boys' opinions in other situations. In a classroom setting, where girls feel overpowered by male dominance and participate less actively, they are blamed for being passive and un-interested in learning. Therefore, what it means to be a girl is to develop feminine subjectivities in different settings, which might differ significantly from one place to another.

Post-structuralists do not theorise a one-way formation of children as passive receivers. They believe in dynamism of interaction between parents, teachers, as well as the society's values, which form the attitudes of the growing children. This means that people are not seen as passively shaped by the social structure, rather they actively take up as their own the discourse through which they are shaped. Hence, as pointed out by (Jones 1993: 158), girls can no longer be seen as simply socialised in their appropriate gender roles. In this theory patriarchy is not considered as a monolithic force, which imposes socialisation on girls. Rather it creates a position for them to enter by participating within those available sets of social practices. Thus, in post-structuralist theory there is no one way in which girls, as a group or as individuals, can be fixed in

their classification. In conclusion this theory disagrees with the view that all power is possessed by one particular group or set of institutions, that it is dispersed from centre, and that it is primarily repressive. Furthermore, this theory does not see power as centrally located and dispersed downwards. It explores the ways in which the socio-cultural hegemonies of dominant groupings are acquired and challenged. However, it does not deny broad patterns of domination and subordination. What it denies is that one theory fits all situations.

Although patterns may differ along all sorts of situations including race, class, and ability, this theory states that the male/female dualism helps to shape the discourse of the individual persons and guides their way of living. An individual's identity, then, is the on-going result of the discourses that have shaped her/his history and his/her world; it is a continuous process of formation and recreation.

Ultimately, seen from a post-structuralist theory, girls' identities are shifting and fragmented, multiple and contradictory, displaced and positioned as they are across the various discourses which historically and currently constitute their lives in and out of school, thus gender power and identity are closely related. In her study of Eritrean girls in secondary schools, (Ogbay 1999: 158) has found that their life experience was multiple and contradictory. She pointed out that "*girls have to accommodate being cleaners, cooks, baby-sitters, students all in the same day*".

Post-structuralist theory encourages gender-related studies and gender reform. It recognises that all boys and girls are complex human beings and active readers of their culture. It encourages openness for a better understanding of situations and dilemmas, which girls as well as boys face at school and outside of school. Moreover, it suggests that as teachers and students interact with gender-related knowledge, such knowledge is negotiated and possibly even transformed in the process. In conclusion, it suggests that whatever the moment or the level, the meaning of gender and gender-reform will be constantly contested, negotiated and appropriated.

### 2.1 Power, identity and achievement in science

The reasons why I chose post-structuralist basis for my study is because it deals with power relationships and power in the formation of one's identity, be it a masculine or feminine. It deals with the world, which is informed and directed by the play of power, creating and setting limits to the truth. It emphasises the various and contradictory

discourses of feminine subjects and a range of ways in which girls can be girls, especially in the context of education. I find this theory open and flexible because it presents a balanced view on the formation of one's identity. I feel also that it is useful to introduce it to an Eritrean context, because Eritrean cultural tradition is rather rigid in its approaches to the formation of people's identity. Whether it is in-school or out-of-school, our culture gives too little power to children, especially to females to express their own individual identity as they see fit. Eritrean cultural tradition is mostly patriarchal and imposes both formal and informal laws upon children and expects them to abide by. Generally speaking women are not in any decision-making positions, and so they have too little power to influence cultural changes. Moreover, most children, especially females grow up feeling that they have too little power to change any thing and fail even to attempt to bring about any change.

As indicated above, in post-structuralist theory, individual identity is on going positioned in discourses that have shaped the history and the world of the individual person in a continuous process of formation and recreation. Furthermore, it is argued that girls identities are shifting, fragmented, multiple and contradictory. However, despite all that, our traditional practices expect girl-pupils to follow a rigid path of life imposed on them and they abide by it with very little resistance. Unfortunately, in the majority of the cases, both males and females faithfully conform to the traditional practices, which are most likely to affect the role of women and girls negatively.

Eritrean girls who study science in secondary schools feel powerless to concentrate in their science education and attain as good results as their counter parts, the boys, who besides having the time to study their subjects, are better encouraged and motivated to achieve. Girls' power in secondary school science education is as limited as any other power, which females experience in Eritrean society. In Eritrea, girls are not expected to be scientists or doctors, hence they internalise the societal views and concentrate less in their secondary science education. In conclusion, although I feel that women should play important roles in the formation of their own identities as individuals and should focus more on achieving as mush as the boys do, my observation is that girls do not feel powerful enough to control their fates in secondary education. Girls' power is limited: a) because the society does not encourage them, and b) because they lack the courage to initiate changes in the traditional practices.

I am in favour of post-stucturalist theory, which has provoked a lot of thinking and created mixed feeling. I liked its recognition that:

- *children are not passive recipients of cultures, but active participants of their fashioning;*
- *it is greatly impacted upon by the broad pattern of societal domination and subordination of cultural practice in the formation of the individuals;*
- *there are multiple positionings of femininity both in school and out of school contexts;*
- *male/female dualism discourse in the formation of identity of the individuals;*
- *the continuos process of human formation and in its re-making;*
- *girls' identities are shifting, fragmented and contradictory.*

This theory points out that each person is partly responsible for who he/she wants to be like. Furthermore, it stands for meanings, which are influenced by shifting patterns of power. It constitutes human subjectivity. It makes problematic notion of truth etc., but above all, it focuses on:

- *Particular rather than the general;*
- *Discontinuity and instability rather than continuity and stability*
- *Diversity and difference rather than similarity and communality;*
- *Un-obscuring of class, race, oppressions and privileges through overlooking specifically an uneven expression in girls everyday life, etc.*

Post-structuralist theory is very powerful and I feel that applying to the Eritrean context would help create more realistic views of human nature and it would encourage more respect and appreciation for each other, especially between males and females.

The paragraphs above focused on the concept of post structuralist theory but the subsequent paragraphs will focus on feminist and feminist post structuralist theories.

**2.2 Feminist theories**

A feminist, according to (Bartky 1990: 11), is someone who supports a programme for the liberation of women and who holds beliefs about the nature of contemporary society appropriate to a political programme. However, given the debates and the complex inter-layering culturally, historically and geographically specific factors (Henry 2001: 98), it can be concluded that there is no consensus as to who feminists are. Contemporary feminism has many faces; therefore understanding its faces is crucial to an understanding of its definition. Until recently, it has been easy to characterise four distinct types of feminist approaches to education, which are: 1) liberal, 2) radical, 3) socialist and 4) post-structuralist theories: (Thomas 1990: 10 & Coffey and Delamont 2000: 5). While there are major differences at the level of theory, all four theories

appear increasingly to agree about what happens in the classroom. These theories have generated different research agendas for education and challenge a view of education, which is concerned only with male experience, by emphasising experiences of both genders. Current feminist theory recognises the influences of post-modern and deconstructive ideas in its approach, (Thorne 1993: 5).

According to the liberal feminist model, education tends to be seen, to some extent, in isolation from the social structure. It emphasises only on individuals and their socialisation. This model points out that education may create and perpetuate inequality; it also has the power to redress it. In conclusion, men and women's main problems are their own attitudes, which are fostered by the education system and the media. This model believes that schools are partly responsible for instilling sexist attitudes into children.

Radical feminist perspectives are of two strands. The first is a belief that education consists of the transmission of 'male' knowledge; i.e. what is taught in schools is simply an account of male experience presented as though it were everybody's experience. It is biased knowledge, pretending to be value free. The second strand of the radical feminist argument is that schooling is part of a process by which the ideas and experiences of girls are trivialised by male pupils and members of staff. Radical feminists see the put-downs and discrimination experienced by girls as the means by which boys, control girls. From the radical feminist perspective, schooling represents one of the ways in which girls are excluded from power. I can say that I partly agree with the views expressed by the liberal and radical feminists, for reasons I place in more detail in chapters five and six.

Socialist feminism regards the relationship between the sexes as political, that is, about power. This model does not regard the relationship between the sexes as the only or even, the main power relationship in societies. Thus women's oppression is not simply a question of individual men oppressing individual women, or of men in general oppressing women; it takes the form of exploitation in the labour market and in the household.

Socialist feminism emphasises the subsidiary role of women in the situation of labour and in setting labour power in the relation of production. But in spite what is indicated

above, all these theories try to explain why the theories are happening to explain the situation. They pointed out that most women maintain the traditional attitude and carry on doing what they have always done. Concerning women's attitude, (Thomas 1990: 11) writes, *"If only women would stop wanting to become housewives and start wanting to become lawyers or doctors instead, the problem would end"*. I agree with Thomas's view, because I believe that if women were to start thinking differently, we would have a different world. Hence, there is a perpetuation of disparity of achievement between males and females in a lot of places because most women are passively accepting their situation as norms and offer too little resistance. In conclusion, the tendency for the feminists is to treat girls' problems as single category, but there is a constant reminder from the post-structuralist perspectives, that any talk of girls must be seen as problematic because of its shifting meanings. A theory, which offers a new way and reconciles feminist with post-structuralist theory is, a feminist post-structuralist theory.

A feminist post-structuralist theory, is a theory, which provides a guiding theoretical inspiration for gender reform in schools. This theory deals with feminist problems, yet its approach is closer to post-structuralism, in that it acknowledges the complex ways in which institutions, meanings, power, human subjectivity and gender come together: (Kenway et al. 1994: 188). In brief, this theory provides more appropriate framework for studying the process of gender reform and I like its approach.

As indicated above, the theories discussed in this section are very important yet very complex. I will return to some of them, especially to the post-structuralist theories, when analysing the data in chapters five-eight.

The socialisation and identity formation process up to this point have centred around the post-structuralist, feminists and feminist post-structuralist theories, but the next section will take us to the socialisation of the in school and out of school factors.

### *3. Socialisation (outside school factors)*

Gender inequalities in school can partly be attributed to the culture. Culture defines the different roles, females and males play in a society. In a patriarchal society such as that of Eritrea, females are expected to be dependent and submissive homemakers, thus, girls do not concentrate much on their education, as some boys would do.

### 3.1 Western literature

The cumulative effects of an early socialisation pattern and the different education experiences have been identified as the likely influencing factors on the differences in performance but these are difficult to assess precisely because they require longitudinal studies. However, the general indication is that there is a different degree of encouragement from significant people, especially parents of the students, although the magnitude of these differences and their effect on the gender of the children's attitudes or achievement may not be too great. The effect of parental and teacher support on motivation is stronger for females than for males. For example, (Murphy 1997: 119) (UK), highlighted the different ways in which parents respond to boys and girls influencing the children's behaviour. An outcome of these different socialisation patterns is how children develop different ways of responding to the world and make sense of it. These include the ways, which influence children's views of what constitutes appropriate behaviour for them and what others expect of them.

The most important persons, by which children are influenced in their community, are their parents and peer-pressure. Parental expectation about their children's academic achievement may vary depending upon the cultural value, which the pupils share. However, expectations that both parents and teachers have about certain subjects, for example, mathematics and science performance in boys and girls, may affect their attitude. A number of studies have shown that parents generally expect less of their daughters than of their sons, particularly in mathematics and science. (Harding 1992) holds that parents and teachers commonly expect boys to perform better in maths than girls and girls internalise the factors, thereby resulting in questioning whether they have the ability to pursue the study of such difficult subjects. Presumably this leads to girls losing interest in maths and science as they leave middle school and redirect their interest to social science content areas, where they are presumed to be more successful. Furthermore, (Harding 1992: 36) recounts that male students in the United Kingdom reported higher levels of parental influence on subject choices than did girls. Parents generally advised their daughters to choose something they (girls) were interested in. On the other hand, where women have, unusually chosen to work in science and technology in Africa, for example, a recent project, including some 50 women, found that a common factor was not ethnic background or financial position, but parental support; (Ibid).

On the same line as in the above, (Renee's 1996: 83) findings point out what some American studies show. For an identical level of performance, the parents of girls more often than the parents of boys, feel that girls' success is due to their hard work and that mathematics is hard for them. Inevitably, they expect less in this subject. In that study parental attitudes are considered as more responsible than the student's grades for the student's anxiety about mathematics and or science. But, teachers and parents are not the only potential source regarding individual pupils' academic success or failure, as (Topping & Bamford 1998: 5) point out. Children's beliefs about their own achievement seem related more to parental expectation than to the parents' own level of achievement.

Contrary to all the findings presented above, (Riddell 1992:185) reports that parents who participated in her study were just as ambitious for their daughters as their sons' educational vision and aspiration. Indeed in one of her site schools, Millbridge, girls' parents had significantly higher expectations than boys' parents, moreover, Riddell found mothers were as ambitious as fathers. She also reported that her findings are reinforced by (Kelly et at. 1982), who points out that parents of girls had slightly higher educational aspirations, than parents of boys. I find Riddell and Kelly et al.'s outcomes different from what my experience has been. Therefore, I conclude that such findings were affected by the cultural values and expectations of the particular people, where the studies took place. Moreover, both Riddell's and Kelly et al's. findings are different from the general trends and the findings of this study, which indicate that parents had lower academic expectations of their daughters than that of their sons.

### 3.2 Literature from African nations

The paragraphs above have presented us with the Western cultural experiences, but as will be seen in the subsequent paragraphs, similar findings were obtained also in the developing countries. A report on Zambia, Zimbabwe and Malawi (Swainson 1995: 16), presented constraints operating against girls which are often divided into 'school based' and 'non school based' factors, which are multi-causal, spanning a wide range of social, economical and political factors. The fact should not be obscured that inequalities stem from gender relations in society at large and these are reflected in and played out in the school system itself. The most plausible explanation is that schools replicate the values of the home and community in terms of undervaluing girls' potential and abilities compared to boys. Such attitudes might have the effect of inhibiting girls, making them

psychologically distanced from schooling and therefore less sensitive to school conditions.

Other reports by Muya (Kenyan Daily Nation, Feb 5, 2001) and (Kitetu 1998) reveal that girls performed poorly in sciences and mathematics compared to boys. The reasons for the disparity are many. However, like those in Eritrea, girls in Kenya seem to be trapped between household responsibilities preventing them from achieving in schools compared to their counterparts, the boys. In agreement with Muya, I would like to say that gender parity in academic performance may be attainable if both sexes are given equal opportunities by the school system, as well as by their own communities.

### *4. In school factors*

International literature, especially those from the Western world as will be indicated in the subsequent paragraphs, point out the factors that determine whether or not males and females engage in the same way with science, are complex. Because of the joint influences of the teachers, the students and the culture in which the curriculum is embedded. Of course it is not sufficient to stop at the classroom level or the school gates. As (Paechter 1998: 116) points out, while today's young people will be important in shaping tomorrow's society, they cannot do so alone. However, it goes without saying that teachers' attitudes play a very important role in their pupils' learning and formation of attitudes, hence, let us now see how teachers' attitudes are interpreted.

#### 4.1 Teachers' attitudes

Teachers' attitudes can be a powerful stimulus to all pupils, but especially to girls' success and/or failure. Teachers can unintentionally reinforce stereotyping of school subjects (as may have been their experiences) by their assumptions about pupils' abilities and interests, leading them to treat boys and girls differently. Researches, as reported by (Whyte 1985: 20 and Harding 1996: 112) in the UK, shows that conservative teachers' views about women, who work on technology, to be a major stumbling block to equal educational opportunities for girls. In an interesting small-scale study, science teachers were asked to rate pupils' science scripts, and to estimate suitability for O-level entrance. When the teachers thought the script was by a girl, their rating of scientific grasp and potential for an 'O' level was significantly lower than when they believed the work was by a boy, although the script was identical. A similar finding was reported also in the UK, (Murphy 1997: 135). When the same piece of

science writing was attributed to girls, it received lower marks from both male and female teachers than when it was attributed to a boy. But when Eritrean teachers in this study were asked about their methods of teaching and in regard to how they treated boys and girls, the majority said they believe themselves to be genuinely committed to equal treatments. However, not all students in this study agreed with the teacher's view in this regard, as will be denoted in chapters 5 and 6, in which several students felt that their science teachers treated boys and girls differently. It is therefore important to stress on the professional implications of unintended sex differentiation, which comes with the informal curriculum.

The findings in this study point out that the informal curriculum describes the ways in which schools transmit values and attitudes to pupils outside the formal curriculum. Unlike the formal curriculum, the informal curriculum is not deliberately planned or intended. This makes its impact all the stronger, as teachers and pupils are not always conscious of the concealed messages being conveyed through the everyday life of the school. Identifying the informal curriculum is a crucial step in tackling the issues of sexism in education as it plays a major part in forming the school ethos, the philosophy and the principles operating within the school. Sexism, according to (Ashcroft & Forman 1994: 150), is the belief, and behaviour which reinforces the belief that one sex, female or male, is inherently superior. This belief restricts the choice and opportunities of one sex. Where this belief is widely held by those in power, whether consciously or unconsciously, it will have its effects on people's life chances.

Informal curriculum may include the ways schools are organised. For example:

- *How public information about the school is presented and whether it conveys stereotyped ideas about the roles of boys and girls*
- *How staffing is structured and the way responsibilities are distributed between female and male teachers*
- *How assemblies are run and whether boys and girls are equally likely to be praised, rewarded or reprimanded*
- *How school outings, events and extra-curricular activities are organised, and whether they equally interest and involve boys and girls*
- *How classrooms are managed or whether boys and girls are equally put to be class monitors.*

Other factors within the informal curriculum give messages to pupils about suitable roles for themselves. These include resources and how they are allocated, the language used in the classrooms, the amount of time spent by teachers interacting with boys and girls etc. Pupils soon learn to pick up the informal messages that men teachers hold more power while women teachers lack status and authority.

**4.2 Teaching/learning Styles**

Information on sex differences in teaching and learning is largely anecdotal. However, there are some suggestions that girls and boys do have different learning styles, and problem solving approaches, (Murphy 1998 & Head 1996). These studies indicated that boys have a more favourable attitude to science than girls do at least in older age groups, where positive attitudes are associated with high achievement. For instance, the examples and applications teachers' use in the UK, (Woolnough 1994: 25), tend to concentrate on topics which interest boys much more than girls. These findings indicate that the impersonal and mechanistic approach of physical science may be off-putting for girls, who tend to be more interested in people than in things. Problems are often phrased in abstract and passive terms, having no apparent connection with situations that are meaningful to pupils. Therefore, the use of more person-oriented examples would help to show how science does in fact affect a whole range of human experience and needs.

The international literature indicates that boys seem to enjoy competitive individualistic work, whereas girls seem to prefer a more relaxed and co-operative atmosphere. However, in this study Eritrean boys were found to be very co-operative with each other in their education e.g., (see Eritrea Profile, Sept. 13,1997). Nonetheless, placing emphasis on co-operation rather than competition could lead to substantial improvements in girls' as well as boys' achievement in secondary science.

The learning styles of boys at primary and secondary school level (in the UK) are reported by the (Redland Papers; 1999: 4). According to this source, boys at the primary level preferred to work independently, were highly competitive, and showed a need to identify certain activities. By the time they reach secondary school, it is suggested that boys have acquired an individualistic competitive vivid style, which has significant implications for their interpersonal relationships with their peers and teachers and for their personal development.

On similar thoughts to the above, (Murphy 1997: 124), has this to say:

> *At age 10 the results showed very similar performance for boys and girls, with girls performing at a higher level than boys on the investigating components. There were national exceptions with males out performing females across the tests in Singapore, whilst in Israel girls performed at a higher level than boys in the seasoning investigating tests, i.e. two out of the three practical test component. For 14-year olds performance was again very similar for males and females. Boys were slightly ahead of girls in Japan and Singapore and the opposite was in the case for Israel.*

Earlier in this study, it was noted how children's play led them to develop different attitudes towards different subjects. In (Murphy 1997: 134), girls across the ages were found to confidently out perform boys on the practical tests of making interpretative observations. It was not the case that girls' performance was higher than boys across all tasks, indeed, this revealed that girls more than boys took notes of colours, sounds, smells and texture. Boys on the other hand, took note of structural details. Thus when asked to observe similar phenomena of objects and events in an open way, girls and boys paid attention to different details. Girls' and boys observations indicated different views of relevance, views that can be traced back to their play and interests in the early years.

### *5. Factors affecting Sex differential achievement*

There is considerable evidence that, even from quite an early age, girls and boys have different interests in different aspects of science. Furthermore, an international science study reported in (Brusselmans-Dehairs et al. 1997: 12) provided opportunity to make comparisons at the age of 10 and 14 years old level. In the findings of the study indicated above, at 10 years old level there was little change, but at the 14 years old level, there was a significant decrease in the level of attainment in all countries that have participated in the study. In conclusion, in that study male students showed more positive attitudes towards the study of science than did the females.

Similarly an international comparative survey of test performances in various school subjects was carried out in 1991 by the Educational Testing Services (ETS) at Princeton USA (Beller & Gafni 1997: 44). The International Assessment Educational Progress (IAEP) was designed to collect and report comparative data of students': achievement, attitudes, background, and classroom experiences. The comparison studies indicated

above have provided a picture of the different contexts to which gender differences can be generalised across various cultures. Results in these researches indicated a slight female superiority in the elementary and middle school years, but substantial male superiority was found in the high school years, the college years and beyond. Furthermore, a study of representative samples of 13 years old children in the U.S. and Thailand found that in both countries gender differences tended to favour boys as level of complexity increased both in computation and comprehension analysis.

Likewise, an assessment of Achievement Programme survey in the UK, according to (Topping & Bamford 1998: 4) suggested little gender difference in performance of girls and boys on most tasks carried out in their research. However, it was remarked that girls outperformed boys in some tasks at primary 4, while boys did better than girls at Primary 7, again producing some evidence of relative gender achievement decline over the years. These studies bring certain highly significant facts. Overall, by the end of elementary school, girls get the same grades as boys, or even better in mathematics and natural sciences. These facts were found to be similar also in the Eritrean context. Girls' performance drops considerably at the end of the first cycle of secondary school, when they lose confidence in their ability to master these subjects and/or discontinue them when these courses become optional.

The international studies consulted provided similar results with the findings of this study in which they pointed out that children of both sexes at the elementary level recorded similar results but in secondary level, boys out performed girls in science. Moreover, at all levels of schooling, according to (Whyte 1984), males showed more interest in science, and were more likely to aspire to a science-based career. It emerged that male students demonstrated more interest in learning science than girls did, which may explain their different achievement.

Some of the literature consulted on gender difference in academic attainment, especially the literature from the UK and Caribbean states, point out the opposite results to what was found in Eritrea. Inspectors in the UK (OSFTED 1996: 17) and in the Caribbean states (Kutnick 2000: 69) have noted that girls and boys in their studies have demonstrated different approaches to planning and organising their work. Although the contexts of the study were in very different technical developmental levels, the outcomes of the researches were similar to each other, probably because they shared

similar values towards individual persons' education and future family responsibilities. In these researches, it was pointed out that girls were more likely to remember to bring equipment to the lesson and to complete their homework. They were more likely to respond to teachers' comments on their work and demonstrated diligence and were more likely to actively participate in science classes. Conversely, as the findings in this study suggest, in Eritrea, more girls failed to do their homework, fewer girls than boys participated actively in class, and girls reported that teachers gave them less attention than they did to the boys in their science classrooms.

In the international studies indicated above, especially in the Western countries, there was a clear trend towards equality of performance between sexes. The trend was consistent with social changes, such as the increasing proportion of women in the labour force, the increase in the age of the first marriage, the substantial drop in fertility rates and the substantial drop in the family size, which could be observed across most countries. It also was consistent with educational changes, such as the declining ratio of male to females at the end of the secondary schools, the declining ratio of male to female teachers at the secondary school and university levels. All these suggest that the influence of gender on science participation and in the positive development of attitudes, values and achievement are partially social.

The above paragraphs have presented us with various factors, which may cause boys and girls to attain different grades in science. Some of these according to (Harding 1992: 16), are early childhood experiences and the feedback received from the teachers. Harding's points are:

> *Because of their pre-school, primary school, household and play experiences, boys may enter secondary school ahead of girls in their sciences achievement and with a more favourable attitude towards sciences. Science teaching in the secondary school builds on this experience and in the case of boys a positive feedback loop linking achievement in an attitude towards science develops. For girls starting off with an unfavourable attitude and less achievement, the feedback loop can have a negative characteristic, so that by the age of 14, boys are generally ahead of girls.*

This quotation is very important in that early childhood experience can play a very important role in the pupils' science learning and in their academic attainment in general. However, my observation is that such views are not recognised and considered as important factors in our schools yet.

On similar lines of thoughts as the above, in the UK (Murphy 1997: 128) argues that content-related performance effects can be traced back to the different learning opportunities that children's gendered play affords them. It is also possible to see some links between these content effects and the gender differences in achieving attitudes established by the national and international surveys. As children engage with activities, they develop skills, knowledge and confidence. In an Eritrean classroom situations these, effects are often undetected by teachers and even the children themselves. Children build on the strengths and interests they bring to schools and continue to develop them within and without school. The downside of this is that, children's alienation from certain content areas and activities related to them, similarly goes undetected and I feel this is what seem to be happening among Eritrean secondary school pupils.

As (Topping & Bamford's 1998: 18) findings indicate, gender differentials in Science performance in England and Scotland seem less than traditionally has been expected. Their views are:

> *In England and Scotland, boys tended to score higher than girls, but the difference reached statistical significance only in one of the four areas of science tested in England. However, science remains proportionately over-chosen by boys at post-16 education, so girls might still not be fulfilling their potential in this respect.*

Sex differences in educational achievement have been variously explained and some of these explanations are biological, cultural, sociological and interactive. Among the biological explanations is the notion that visual, spatial ability is carried by a recessive gene, attached to the X chromosome. (Ashcroft et al. 1996: 106) present their view in the following:

> *This theory states that women carry two X chromosomes. The effect of the recessive gene may be 'cancelled' by another X chromosome that does also carry the gene. Men have only one X chromosome, and therefore the gene will be expressed more often in them. ... Another biological theory relates to brain lateralisation is that males, supposedly more often use the part of the brain where spatial ability is located and women use the part associated with languages.*

These views are complicated yet stimulating and thought provoking, nonetheless. Although there is not enough reason to accept them as facts, it is tempting to consider them as possibilities for being responsible for the male students' superiority in science. This is not to proclaim that I am in agreement with the argument about the chromosomes. The views concerning genes are arguable and there is a need to consider

whether these theories are soundly based and whether there is a precise linkage between the chromosomes, brain-hemisphere and specific mental abilities or it is based on some cultural attributes. Moreover, if these theories are true, what explanations can be given to the women who are extraordinarily good in their spatial ability, and the men who are extremely articulate in their linguistic ability? Moreover, what explanation can be given to the quotation here below?

> *In an international secondary school examinations in mathematics, physics, chemistry and biology organised in 1991, 1992 and 1994, eight students (including one girl) from the special class of the school won gold medals in chemistry, one silver medal in mathematics, and one bronze medal in biology. The girl won the-gold medal in chemistry in 1992; (Renee 1996: 93)*

Although it may appear too simplistic I will use an analogy of an unused muscle in an attempt to explain the possibility for the male/female-brain lateralisation theory. If a muscle is not used for a prolonged time, it will weaken and probably even die, however, if a muscle is used frequently, it will remain healthy and strong.

For thousands or possibly millions of generations men and women have lived exercising gender-ascribed activities and in the process each gender has evolved (strengthened/weakened) the different parts of the brains responsible for the activities required. For as long as human story is told males were engaged with thinking and solving issue in terms of technical and spatial problems and women were responsible for the various needs in the house and family using/refining skills necessary for functioning well in their home environment. Hence, each has developed the part of the brain responsible for the various needs. Furthermore, it is not even 50 years since women in the Developing countries for that matter even in the West, started entering the field of education, so given enough time and exercise they will catch up with the men in attaining good results in the science and technology. In spite of diverging interpretations of the phenomenon about biological factors, I prefer to agree with (Murphy 1997: 124): who states that achievement difference is not due to a biological predisposition in women and men for a specific type of knowledge, rather that it is due to the stereotyped social expectations that differ with each sex.

Another important factor concerning achievement in girls is the examinations, i.e. the type or mode of assessment used in our schools. Several international (UNESCO) studies, e.g. (Beller and Gafni 1991: 45), reflect that boys are more successful than girls in answering multiple choice questions, while girls are sometimes more successful than

boys in essay type papers. Mostly multiple choice examination types are used in ESECE or Eritrean national examinations, as the students like to call them. But papers with structured questions seem to be answered equally well by both sexes. However, about multiple choice tests, (Whyte 1984: 18) has the following argument:

> *We know little about the skills that are required to achieve well in multiple choice tests and we may be neglecting to nurture communication and reflective skills that other modes of assessment encourage if we abandon them. We must ask how validly the assessment matches the understanding possessed by the candidates and how well the skills we are assessing match the skills that are required in future practice within the subject area. It is possible that the greater use of multiple choice papers in school science examinations will undoubtedly cause to girls a greater sense of their own inadequacies.*

This quotation is very significant, but unfortunately I do not feel that such views are commonly considered in the Eritrean context.

Up to this point I have been discussing about factors which affect gender difference in learning but will now move on to see how different school types affect pupils' learning.

### 5.1 Co-educational versus single-sex Schools

The international studies, especially those from the Western world do not provide enough information to allow for explanation about the gender differences in achievement. However, data in (Brusselman-Dehirs et al. 1997), reflects that students who go to single-sex schools obtain better results and this contributes to the difference. In mixed schools, the generalised statements about boys had the unfortunate consequences of disguising the fact that schools should consider the specific needs of adolescent boys and girls.

An analysis of the (OFSTED inspection report 1996: 24) suggests that the quality of education in single-sex and mixed schools reflect well-established differences in the performance and attitudes of girls and boys. In other words, the fact that girls generally have more positive attitudes than boys, and achieve higher standards, is a significant factor in the relative success of the different types of schools. Therefore, in almost all the areas covered by the Framework for Inspection, girls' schools were generally found to perform best; mixed schools next, followed by boys' schools. Because of my personal experience, I could see why single sex schools, especially girls' schools foster achievement, but I wonder why boys' schools in this report were not as successful.

There could be many factors responsible for the single sex school results, but according to (Whyte 1984: 2), some studies in England suggest that, despite the supposed advantages of co-education, mixed schools tend to encourage the separation of males and females into specialising physical and biological sciences.

There are marked variations in the positions of individual schools, whether mixed or single-sex, (Watson 1997). However, much depends on the socio-economic context of the school and the ability profile of its intake. With regard to standards, management and efficiency, ethos and the overall quality of education, the schools judged to be the most successful are often girls' schools in advantaged areas. In single sex-schools, girls are under less direct pressure to conform to stereotypes and, therefore, find it easier to choose subjects non-traditionally identified as girls' subjects. (The OFSTED 1996: 11) report suggests that girls' schools in the UK tend to cater more positively for equal opportunities than boys' schools. Girls' schools often have a longer history of considering gender issues, in particular of building into their curriculum an awareness of the significance of gender as a factor in the world of work.

In addition, girls' schools are more likely to have women staff teaching non-traditional subjects. The chance of girls being taught science and mathematics by women is considerably higher in girls' school. With successful role models in these areas, girls are encouraged into the field themselves. In such schools, women are more likely to hold senior posts, and therefore are seen by the female pupils in positions of responsibilities more than they would in a co-educational environment. In many ways girls' schools appear to offer chances of gaining a well-rounded education. More importantly, girls do not have to compete with boys for teacher attention, discussion time, science equipment and other resources. I know all this to be true because I have received most of my education in girls' schools and besides finding it to be true, it was beneficial for me and for all my school-mates. There are no single sex secondary schools in Eritrea these days and participants in this study were not asked to give their view about it, however, recognising their benefits, I wish they were re-introduced also in the present Eritrea.

Earlier in this chapter we have seen the ways in which girls appeared to endorse traditional gender divisions in the curriculum, while at the same time supporting the general principles of equal opportunities. A report about some girls' experience from

Uganda, shows the effect of the different schooling system. According to (Lubega 1998), some girls were moved from a single sex 'O' level school to 'A' level co-educational school and their performance dropped with the movement.

> *Girls moved from single sex schools, where they had scored very good marks, but on joining mixed schools their performance slackened. The hidden agenda worked in them and ended up being second best in things they could have continued to excel in.... Even things like going to the dining hall became a hustle for the girls. Going to the dining hall to eat your food like normal became a horrendous ordeal. The boys would tease and boo you, and nickname you 'blender'. This term carried a negative connotation and it was actually thrown at you to undermine your self-esteem and pride.*

The story goes on to show that co-ed schools are detrimental to girls' education. I place this example here because it reminds me of my experience when I moved from a girls' to a boys' high school. It also reminds me of the current secondary schools in Eritrea, which are all co-educational and male dominated and hence reminds me of the negative impact this creates on girls' achievement, especially in regards to science subjects.

There is wide spread evidence from many countries, including Zambia, Zimbabwe and Malawi (Swainson 1995: 31), that educational outcome for girls attending single sex schools is better than girls when enrolled in mixed schools. The generally negative environments for girls in mixed schools goes a long way to explain why girls perform better in single sex schools (and single sex boarding schools in particular). Most heads of single sex girls' schools are females and although not all, most of the staff are also females. Such institutions provide positive role models for girls. However, little detailed research is available that explains the process operating at these schools.

In addition to the report above, Swainson points out that in Zambia it is well known that girls attending single sex schools performed better than at mixed schools, mainly because girls are not socially rewarded for good performance at mixed schools. Although this effect occurs consistently in each province, in some it was very strong. For instance, in the central province, 63% of girls in single sex schools obtained full certificates as against 16.5% of those in co-educational schools. However, the factor of quality must be taken into account, as some were mission schools and others boarding schools. In this report the main vocational training organisation in Zambia received more applications (70%) from girls, who had attended single sex schools than from mixed schools. Besides, while half of the girls taking exams in Malawi came from

single sex schools, (70%) of the girls who gained admission to the Chancellor College came from single sex schools.

I have selected the findings about single sex schools to point out that what pupils learn at school, they take with them into society, so by changing the climate of schools it is possible to affect the society, at least to some degree. To attain some of the results indicated above, it may be necessary to consider re-introduction of single-sex secondary schools in Eritrea. By suggesting this, it is hoped that some of those with an interest in education (teachers, parents, government), who, perhaps, have never given the question of single sex schools a thought, might begin to think through the implications of co-educating girls and boys, and consider whether this practice is working or not; (Deem (1984: xii).

The paragraphs above have focused on factors, which hamper and/or encourage girls' achievement at secondary level. However, since self-esteem is an important factor for children's achievement or otherwise, the subsequent section will deal about self-esteem.

**5.2 Confidence and self-esteem**

Children's early years' experiences are crucial in forming their perceptions of what constitutes girls' and boys' domains. In situations where children are perceived to be in their territories, they behave with confidence, whereas being out of territory renders them different. Thus children in school need to feel comfortable and empowered. (Ashcroft et al. 1996: 67) maintain that students learn better if they feel empowered, and valued; however, teachers' or society's low expectations of them, might impede this, predicting and encouraging their failure. The labels people use for themselves, are important aspects of the ways they value or fail to value themselves. Other people's labels may affect pupils, especially girls, if they feel undervalued. Nevertheless, as was pointed out earlier in this chapter, in the post-structuralist-theory, students may value themselves differently in different contexts, i.e. possibly express high self-esteem within the family and community, but low esteem elsewhere.

Literature on self-esteem and education tend to be dominated by at least three premises, (Ashcroft et al. 1996: 131). These are; a) that low self-esteem is a problem, b) that it is a problem for certain individuals, and c) that it prevents them making the best of their schooling and their lives. Further, the literature attributes low self-esteem to individuals

who belong to those social groups, which are least valued by society. Hence a lack of self-esteem is often associated with groups other than the socially dominant group and because Eritrean girls are socially less valued and less dominant, it is possible to conclude that their lack of self-esteem can be associated to the factors listed above.

Furthermore, achievement motivation, locus control and fear of failure are what (Bandura 1990) calls self-efficacy, which is a person's belief in having the power to succeed or to fail. Belief in ones' own capabilities is a very useful attitude and it may be linked to various positive outcomes, encouraging individuals to be adventurous and ambitious. On similar lines, as the above, (Howe 1999: 121) points out the importance and effects of a person's self-conception for failing or being successful. This means, experience of succeeding or failing contributes to a person's assessment of his/her own ability and to expectancies concerning success or failure in the future. The hypothesis here is that Eritrean pupils especially girls, encounter academic failure, and with accumulation of further failure, they become increasingly distressed and experience feelings of hopelessness and develop low self-esteem.

In Australia (Kenway and Willis 1990: 2) it is stated that girls have lower self-esteem and achieve less than boys, particularly in certain fields. Of course the literature relating to school achievement and to students' self-esteem is not limited to gender alone. Low self-esteem has been used to explain other educational and social failure as well; however, since this study is concerned about gender issues and academic achievement, it focuses mainly on those two issues.

Evidence from classroom interaction by (Murphy 1997: 128) in the UK also indicates that boys overestimate their mathematical ability, whereas, the reverse is the case for girls. Indeed young males compared to females consistently rated their abilities more highly than females and teachers believe and work on similar lines. Moreover, Murphy has pointed out that both teachers and the girls themselves believed that, girls lacked confidence in their mathematical ability and were more fearful of failure than were boys. I, too, have noted these factors in some of the participants in this study in which boys and girls have rated themselves differently, i.e., girls more than boys underestimated their potential to succeed in science, consequently some studied less consistently.

The experiences referred to in the previous paragraphs contributed to the gender differences found on self-esteem. Moreover, (Beker and Bruton 1994) pointed out that women in the UK generally had less confidence in their ability; this seemed to contribute to lack of ambition for a higher career. The men in their study expressed confidence in their abilities, and usually denied having any difficulties in course work or other aspects of their graduate programme. As illustrated in their comments, the women in Beker and Bruton's study were more likely to spontaneously mention difficult points in their programmes and in their coping mechanisms. Although there was no evidence from their grades or degree of attainment that women were less successful, they just seemed to feel that way. The phenomenon of low Self-concept seems to be more prone in women than it is in men. At least I know this to be true both for myself and for several of my female colleagues, who despite our successful accomplishment in whatever we do, we often express low confidence in ourselves and underestimate our potentials.

Beyond, and underlying, the cognitive dimension of learning is the affective domain, in which the importance of the pupils' commitment, determination, enthusiasm and self-confidence cannot be over-estimated. Research from the USA, (Topping and Bamford 1998: 5) had suggested that girls' interest and confidence in mathematics dropped in early adolescence before their actual performance in maths dropped. This led to the proposal that if their interest and confidence could be maintained, so could their performance. In addition there were physiological and psychological factors in which girls sometimes lacked perseverance and will power compared to boys. Therefore, schools could try to stimulate the spirit of enterprise and self-confidence to encourage all learners irrespective of their sex.

### *6. Gaps in the literature*

As there were major gaps in the local literature for this study, I have used international literature. The literature consulted, especially those of the Developing countries were chosen in the hope of finding similarities to the situation in Eritrea. Not surprisingly, some of the literature had similarity with the Eritrean situation and others were in total contrast to it. Over all the majority of the findings in the literature had similarities with the findings in this study, however, in some of the literature from the UK and the Caribbean states, probably because of the different values maintained in the societies,

the findings were very different.

Eritrea is a new nation and it has little or no literature in regard to the issues in this study. Therefore, while the work was in progress, the following questions were constantly in my mind:

1. *Is it possible to conduct a study about a country without a sufficient and relevant local literature on the issue in discussion?*
2. *Is it practical to base ones' literature review on other countries' experiences, which may have different values, attitudes and practices?*
3. *Is it realistic to corroborate so much on Western literature in order to understand gender education of a young African nation, Eritrea?*

Even though I envisaged all these difficulties, I thought that someone has to start to do something about it and decided to do what was possible. To resolve some of the problems indicated above, I tried to set several questionnaires directed to different groups of Eritrean participants. Moreover, as will be indicated in chapter four, I tried to use multi-method approach with the hope of obtaining diverse views of the Eritrean people.

### *7. Summary*

The cumulative effects of an early socialisation pattern and the different education experiences, have been identified as the likely influencing factors on the differences in performance. An outcome of these different socialisation patterns is how children develop different ways of responding to the world and making sense of it. Post structuralism considers several factors affecting boys and girls both in-school and out-of-school. These include in-school factors, which are associated with the school's cultures and subcultures; while those out-of-school factors will include the discourses of family and the local community and those associated with the student's ethnicity or culture. This theory encourages gender reforms, recognises that boys and girls are complex human beings and active readers of their culture. Furthermore, it encourages openness for a better understanding of situations and dilemmas, which girls as well as boys face at school and outside-of-school. Feminist post-structuralist theory, on the other hand, is a theory, which provides a guiding theoretical inspiration for gender reform in schools.

The different ways parents respond to boys and girls influence the children's behaviour. In some cultures, parents and teachers commonly expect boys to perform better in maths than girls and girls internalise the factors, thereby resulting in questioning whether they have the ability to pursue the study of such difficult subjects. Presumably, this leads to girls losing interest in math and science, as they leave middle school and redirect their interest to social science content areas, where they are presumed to be more successful.

Literature on the developing countries, e.g. a report about Zambia, Zimbabwe and Malawi (Swainson 1995), presented constraints operating against girls, which are often divided into school-based and non-school-based factors, which are muti-causal, spanning a wide range of social, economical and political factors. The most plausible explanation is that schools replicate the values of the home and community, in terms of undervaluing girls' potential and abilities compared to boys. Such attitudes might have the effect of inhibiting girls, making them psychologically distanced from schooling and therefore less sensitive to school conditions. Moreover, there is the informal curriculum, the way in which schools transmit values and attitudes to pupils outside the formal curriculum. Pupils soon learn to pick up the informal messages that men teachers hold more power while women teachers lack status and authority.

It was pointed out the factors that determine whether or not males and females engage in the same way with science are complex, because of the joint influences of the teacher, the students and the culture in which the curriculum is embedded. Nonetheless, teachers can, unintentionally, reinforce stereotyping of school subjects in which schools transmit values and attitudes to pupils outside the formal curriculum. Other people's labels may affect pupils, especially girls, if they feel undervalued and girls have lower self-esteem and achieve less than boys, particularly in certain fields of studies. Moreover, the effect of parental and teacher support on motivation is stronger for females than for males.

This study indicated that the information on sex differences in teaching and learning is largely anecdotal; however, there are some suggestions that girls and boys do have different learning styles, and problem solving approaches. The impersonal and mechanistic approach of physical science may be off-putting for girls, who tend to be more interested in people than in things. Likewise, it was indicated that boys have a

more favourable attitude to science than girls do, at least in older age groups, where positive attitudes are associated with high achievement. In literature, boys seem to enjoy competitive individualistic work, whereas girls seem to prefer a more relaxed and co-operative atmosphere. The experience of the Eritrean pupils found that boys were co-operative with each other while studying.

Concerning the factors affecting sex differential achievement, there is considerable evidence that at an elementary school level, girls get the same grades as boys, or even better in mathematics and natural sciences. The international studies have obtained similar results in that they reported children of both sexes at the elementary level obtained the same results, but in secondary level, boys performed better than girls in science. Moreover, at all levels of schooling according to (Whyte 1984), males show more interest in science, and were more likely to aspire to a science-based career. It emerged that male students demonstrated more interest in learning science than girls did, which may explain why there is there a difference in their academic achievement.

Another factor, which may be the cause of the different results, is the type of examinations pupils are presented with. Several studies, for example (Beller and Gafni 1991) reflect that boys are more successful than girls in answering multiple choice questions, while girls are sometimes more successful than boys in essay type papers. Since mostly multiple choice type of examinations are used in Eritrea, it is possible that girls feel a sense of inadequacy.

Studies about science do not provide enough information to allow for explanation about the gender differences. However, data in (Brusselman-Dehirs et al. 1997), (an international study) reflect that students, who go to single-sex schools, may contribute to the differences. In mixed schools, generalised statements about boys had the unfortunate consequences of disguising that schools consider the specific needs of adolescent boys and girls. In the UK an analysis of the (OSFTED inspection report 1996) suggests that the quality of education in single-sex and mixed schools reflect well-established differences in the performance and attitudes of girls and boys. In other words, the fact that girls generally have more positive attitudes than boys, and achieve higher standards, is a significant factor in the relative success of the different types of schools. Therefore, in almost all the areas covered by the Framework for Inspection,

girls' schools are generally found to perform best, mixed schools next, followed by boys' schools.

There is wide spread evidence from many Developing countries including Zambia, Zimbabwe and Malawi (Swainson 1995) that educational outcome for girls attending single sex schools is better than in mixed schools. The generally negative environments for girls in mixed schools goes a long way to explain why girls perform better in single sex schools (and single sex boarding schools in particular). Most heads of single sex girls' schools are females and although not all, most of the staff are also females. Such institutions provide positive role models for girls. Likewise the report above pointed out that in Zambia, it is well known that girls attending single sex schools perform better than in mixed schools, mainly because girls are not socially rewarded for good performance at mixed schools.

## *8. Concluding remarks*

This chapter has covered wide international literature; it has looked into post-structuralist, feminist, feminist post-structuralist theories, aspects of socialisation and factors affecting achievement from various standpoints. It has cited several sources of evidence to show how outside-of-school factors influence learning inside-school and has discussed how children's learning gender preferences lead them to pursue different interests in learning science subjects.

The many presentations and discussions revealed a wealth of findings, with very stimulating effects. A wide array of results have become available; many promising examples have been offered, the implication, of which are relevant lessons for all of these attempts. The issue of girls' educational advancement goes without saying. It needs to go beyond a mere quantitative increase of their educational opportunities. Since females' education has its basis in culture and their roles are culturally defined, effective changes in their status lies in changing the attitudes towards them.

This chapter focused on an international literature review, but the next chapter will take us to the context of the study, Eritrea, and it will introduce the reader to the country's geographical location and its system of education

## *CHAPTER THREE*

# *1. THE CONTEXT OF THE STUDY: ERITREA*

## 1.1 Introduction

The objective of this chapter is to introduce and familiarise the reader with Eritrea's history of formal education, its contemporary challenges, its secondary schools' situation and its human resources in education. In the first section the chapter briefly presents the country's geographical location, its population, religion, economy and history. Furthermore, it presents the history of its educational system in the different periods. These periods include: pre-colonialism, federation/Ethiopian control, armed struggle and the present time. In the end it discusses the rationale for the study.

Eritrea has four physical regions: the Red Sea coastal plain; the south-central plateau highland, which form the core of the country, the hills of the northern and west-central areas and the broad western plains. The Red Sea coast stretches more than 1,000 km. (600 mi.) and it is from this body of water that the country derives its name (Greek, erythraea; 'red').

Eritrea, an independent state in North Eastern Africa, is bordered on the east by the Red Sea, on the south-east by Djibouti, on the south and west by Ethiopia, and on the north and north-west by Sudan. Formerly under Italian control, Eritrea was taken over by Britain during World War II and was a British Protectorate from 1941-1952, when it was federated with Ethiopia.

The incorporation of Eritrea as a province of Ethiopia in 1952, helped to provoke a long war of liberation, which culminated in 1991 after thirty years of war. Eritrea got its official independence in May 1993 after a UN supervised referendum in which 99.8% of the people voted in favour of Eritrea's independence. The nation has an area of 121, 144 sq. km. (46,774 sq. mi) and a population of roughly 4,135,933 (July 2000 est.)

## 1.2 Population

### *1.2.1 Ethnic groups and languages*

Eritrea is a home to various ethnic origins with diverse cultural traditions and languages. The ethnic groups and languages include: Afar, Arabic, Beniarmir, Bilen, Kunama, Hidarib, Tigre, Tigrigna, and Saho. Geez is another language, which is the

origin for the Tigrina and Tigre languages and is a liturgic language for the Orthodox and Catholic Churches. Of the ten languages listed above, Arabic and Tigrigna were adopted by the national assembly as the governments' working languages.

### *1.2.2 Age structure*

The age structure of Eritrean population is estimated to be as the following:

- 0-14 years: 43% (male 888,573; female 883,939)
- 15-64 years: 54% (male 1,104,082; female 1,122,683)
- 65 years and over: 3.86% (male 69,518; female 67,138) (2000 est.)

### *1.2.3 Religions*

Islam and Christianity: Orthodox, Catholic and Protestant Churches.

### *1.2.4 Life expectancy:*

- Total population: 55.79 years
- Male: 53.36 years
- Female: 58.29 years (2000 est.)

**NB**: **the statistical numbers given above are estimates, as no proper census has been in the last eight years or so.**

## 1.3 Economy:

With independence from Ethiopia on 24 May 1993, Eritrea faced the economic problems of a small, desperately poor country. The economy is largely based on subsistence agriculture, with 80% of the population involved in farming and herding. The small industrial sector consists mainly of light industries.

## 1.4 Division of labour

In towns men and women may work in the jobs according to their qualifications and they are paid the same salaries. However, in most cases, men are employed in a variety of jobs, while women are employed in limited jobs. Women may be employed as manual factory workers, secretaries, kindergarten teachers, elementary school teachers, secondary school teachers, hospital nurses and in a few cases medical doctors and university professors. Whether women work outside the home or not, they shoulder the entire home responsibility above and beyond their employment and unlike in the rural areas, men in the towns give no hand in the house. The only thing they contribute to their homes is to share their salary.

In the countryside, men and women have equally shared but different types of jobs. Men usually work outside the home on the farm and tend the animals, while the women stay mostly at home and do all the housework. Women help on the farm when it is time

for weeding and harvesting the crop and men help their women to bring firewood and water and care for the children occasionally when needs arise.

## *2. History of formal education in Eritrea*

In (traditional) Eritrea, before the 1880s, the start of the Italian occupation, formal education was established for religious purposes. Traditional learning patterns reflected the agricultural and pastoral life of Eritrea, and were suited to the needs of the people. Education fitted the young for their roles in the communal life. Skills and crafts were handed down from one generation to the next, along with traditions, customs, and knowledge of the complex system of rights and duties that governed the society.

The aim of this traditional education was to prepare males for religious vocations and, in a few cases, for secular occupations that required literacy. Eritrean women remained non-literate and girls received much of their education from their mothers, who focused on the duties associated with being wives and mothers.

### 2.1 Colonialism

Italian colonialism brought limited modern education to Eritrea—male Eritreans received education up to a fourth-grade level. A handful of state vocational schools were established to train boys as non-commissioned officers, artisans, clerks, male nurses, and plantation workers. There were also Catholic and Protestant missionary schools, which largely excluded females. In this period (1880-1942) post primary education was minimal, since the Italians were convinced that higher education might inculcate in Eritreans an anti-colonial outlook.

The purpose of Italian education in Eritrea was quite narrow. It was to introduce to Eritreans a devotion for Italy and a respect for Italian culture and civilisation. The limited number of schools, which existed, aimed at producing Eritreans who would become native troops, interpreters, clerks, telephone operators or typists. After almost sixty years of Italian colonisation in Eritrea, only a small predominantly male segment of the population could claim rudimentary schooling, and only a minority with 'assimilated status', were given the opportunity to pursue their education. The greatest expansion in education under the Italians came, not surprisingly, given the above statements, during the period leading up to the invasion of Ethiopia in 1936.

Eritrean educational institutions under Italian colonialism had a pattern of deliberate exclusion of females and sex-differentiated schooling. Under both Italian (1889-1941) and British (1941-1952) colonialism, there was no effort to educate or develop the skills of women. In addition, Western patriarchal conceptions of acceptable sex- roles contributed to different educational opportunities for boys and girls.

With the defeat of the Italians, in East Africa, the British Military Administration, in Eritrea, in keeping with traditional British policies, sought to provide a level of education, to train Eritreans as functionaries in the administration in order to reduce costs. Thus it may be concluded that generally, the British were less stringent than the Italians in restricting educational opportunities for the Eritreans and they oversaw a notable expansion of schools in villages and towns. During this period (1941-52) the reward of schooling became visible and the Eritreans' desire for education increased rapidly.

### 2.2 Federation and Ethiopian control

With the change of government in 1952, when Eritrea was federated with Ethiopia, there was a determined advance in education and the first secondary schools were opened in 1956. From 1952-1974, Eritrea was controlled by Emperor Haileselassie of Ethiopia, who encouraged education both in the towns and villages. During this period many Eritrean youth (both males and females) took advantage of the access to education and the rate of literacy increased dramatically.

### 2.3 Armed struggle

During the mid-1970s, the Eritrean People's Liberation Front (EPLF) recognised the need for education and to engage the full and active participation of Eritrean women in the liberation struggle. With this recognition, came a commitment that has continued beyond independence to establish educational equality between the genders. Education was recognised as crucial in transforming both men and women and enabling them to redefine their private and public roles and below are the different periods of the country's educational development.

*Table 1*

***Growth of Education in Eritrea***

| *Different administrative periods* | *Italian 1896-1940* | *British 1941-1951* | *Federation 1951-1962* | *Annexation 1963-1991* | *Liberation Since 1991* |
|---|---|---|---|---|---|
| | *1937* | *1950* | *1962* | *1991* | *1996* |
| *Students* | *2,473* | *9,993* | *43,944* | *168,783* | *320,627* |
| *Teachers* | - | *242* | *1,945* | *4,269* | *7,857* |
| *Schools* | *20* | *33* | *207* | *292* | *671* |

***Source: Ogubazghi and Holmes, 1998***

The table indicates the number of the students, teachers and schools during each of the main administrative periods of Eritrean history.

## *3. Contemporary period*

The contemporary period (1961-2001), which commenced with the starting of the war for national liberation, represents a radical departure in the relevant function of the system in Eritrea. During the period, as the table above demonstrates, the number of schools grew rapidly and there was a significant break with the long-standing prohibition against women pursuing educational opportunities. Thus, in today's Eritrea education is for all children regardless of their sex.

Moreover, aware of the neglect education has suffered under successive colonial governments, the current Eritrean government has declared a policy of basic education for all. This, which embraces an element of equal educational opportunities, allows every Eritrean citizen the right to education, which is compulsory up to the intermediate school level.

During the period of armed struggle, education was viewed, by political leaders, as an integral part of the national liberation struggle; educational goals and objectives that were pursued during the liberation struggle have been adopted and expanded by the post-independent government. Currently education is valued by policy-makers as a core element of nation building; and the design of the strategy is linked to a large social vision that is egalitarian and responsive to the interests of all the citizens.

After the long and costly war (30 years), the newly independent state was in dire need of reconstruction and rehabilitation, as the economy and infrastructure had collapsed

and the social services had disintegrated. Its human resources development was greatly hampered during the struggle, as its youth were persecuted and displaced. The quality of education had so much deteriorated that there was a crisis in the system. After independence, however, education has been placed among the top priorities of the government. The national development strategy, outlined a macro-policy document in 1994 which had the following major objectives:

- *to produce a population equipped with the necessary skills, knowledge and culture for a self-reliant and modern economy,*
- *to develop self-consciousness, self-motivation in the population to fight poverty, disease, and all the attendant causes of backwardness and ignorance; and*
- *to make basic education available to all.*

The education sector policy, which has been developed since 1991, is an embodiment of the principles (implied in the above objectives), which include the promotion of equal opportunity in terms of access, equity, relevance and continuity of education to all school-aged children. But unfortunately there is a gap between policy statements and what actually happens. Had there been suitable implementations of the policies, indicated above, the country would have obtained more or less similar educational achievement by the male and female pupils in secondary education.

There is a desire of commitment to ensure that education engages and is accessible to the vast majority of the Eritrean children. The pedagogical approaches followed are believed to promote active learning and collective co-operation, where a great deal of emphasis is placed on peer learning. The education system also aspires to combine the theoretical learning with practical work. To this effect secondary school pupils are involved in shaping their educational experiences during the summer-vacations, when they are sent to different parts of the country for about six weeks. Pupils are sent to these places to explore both the land of their ancestors and work for the country's development; Eritrea Profile (August 2, 1997). The pupils who go for the field works are grades $8^{th}$, $9^{th}$, and $10^{th}$ whose age is 16 and above. Although some of these pupils may be assigned to other ministries, they usually work under the Ministry of Agriculture and/or the Ministry of Construction.

The summer work experience may have many positive values for the pupils and for the nation at large, for example apart from protecting the environment and reconstructing the basic infrastructure, they exchange experiences with each other. Pupils are usually assigned to different parts of the country preferably away from their home

administrative zones. However, I feel that this system needs some assessment and evaluation to see: a) how much of the work they do is related to their classroom theoretical learning, b) whether it benefits the individual pupils and the families they leave behind, c) and whether is has positive or negative effects on the Eritrean society at large. Because some pupils as well as parents in the interview have indicated their concern about its effectiveness.

### 3.1 Emancipated women in the contemporary Eritrea

In Estifanos: 1997, it was pointed out that Eritrean women in the 1970s were fully engaged in the liberation struggle. Back then they were appreciated but in the contemporary Eritrea, female ex-fighters are least cherished by almost every one in the society. For example by the local employers, their own families and even their male companions of the armed struggle who in most cases have abandoned them to marry younger and more submissive women. These emancipated Ex-fighters are disproved for they way they think and act like. Hence, there is a view that Eritrean girls may be afraid of appearing emancipated for fear of falling into the same fate of their elder sisters, the ex-fighters.

### 3.2 Contemporary education

The structure of the school system in Eritrea is, five years of elementary school, two years of junior secondary school, four years of senior secondary school and four years of University education. The Senior Secondary Schools have the following branches or streams: Natural science, social science, commercial schools, and technical schools.

In the last year of their senior secondary education, the pupils take national standard exams (ESECE) in English and Mathematics, which are mandatory subjects and three or more subjects of their choice from their majors. These exams are also used as the University entrance exam.

If pupils pass the ESECE exams satisfactorily (i.e. by obtaining A, B, C, D grades which are equivalent to 4, 3, 2, 1, great point average), they can enter the university. But based on the records of the exams, it can be concluded that many pupils find the exams very difficult to pass. Since independence, only 11-14% of the candidates have been successful in obtaining acceptable results to join the University. The subjects which pupils find most difficult are usually Mathematics and Science. However,

despite the exam results, the number of candidates wanting to join the university has increased in recent years.

In Eritrea, education is free i.e. the state covers all the expenses, including the boarding for some junior and senior secondary school pupils, the students at the Teacher Training Institute (TTI) and the University students. After their graduation, most of the University graduates and all of the TTI graduates are employed by the government in the appropriate sectors or Ministries (Eritrea Profile Sept. 5, 1997). The university realises that accepting a large number of students in certain faculties without offering them employment in the public sector after graduation, is not a good policy. Therefore, the number of candidates, accepted by the University every year, is limited. The faculties take only the number of students that can be absorbed in the public and/or private sectors after graduation.

In Eritrea, academic achievement is essential (at all levels) for being promoted from one class to the other and for finding jobs after the graduation. Moreover, academic achievement is essential for all the youth, therefore, some secondary school pupils attend private tutorials, to enable them to have a better grasp of the subjects both in secondary education and a better chance to prepare them entrance to the university. Thus, although education is free in the public schools, some parents invest money in private tuition for their children's education. These children usually attend their tutorials from the early secondary school years and at times even from the late primary school years. The private tutorials customarily take place in the late afternoons (after the school hours) or during the weekends. But those who choose to pay for private tutors are either the few who value education highly or those who can afford to spare some money for the purpose. The majority of the families do not spend money on private tutors. That is probably why so few pupils achieve good results in the science subjects since there are too many pupils per class and teachers have to teach too many sections in the morning as well as in the afternoon shifts. Therefore, it becomes difficult to detect pupils' weaknesses and give them the individual attention as the private tutors would.

As it were, high scholastic achievement with or without university qualifications will secure a place in the lines of employment. Of course, university graduates stand a better chance. Academic achievement at university level and or a postgraduate qualification,

will give graduates better chances of employment both in the private and public sectors. Because of this, university entrance in Eritrea is very competitive. Secondary school pupils, too, are aware of the fact that, if they are not successful in their studies they risk being unemployed later, so they often work hard, but they are not always as successful as they aim to be.

*Table 2*

***This data shows the 11th grade 1997 Eritrean Secondary Education Certificate Examination results.***

| Candidates | Male | Female | Total |
|---|---|---|---|
| Wrote | 5,065 | 2.300 | 7.365 |
| Passed | 925 | 159 | 1,084 |
| Percent | 18.3 | 6.9 | 14.7 |

**Source:** ***Ministry of Education***

Because of the factors listed above, Eritrean secondary school pupils usually work hard to succeed in their studies and the Government, on its part, shows determination to succeed in education, technological development and economic advancement through hard work and self-reliance. The following quotation from Eritrean News Agency Update (ERINA Update, 1999) is a reflection of the national policy.

> *Eritrea's focus on national development since 1991, as evidenced by World Bank growth figures, is further underlined by the demobilisation of 65% of Eritrea's liberation army by 1993 and accelerated spending on education culminating in a 400% education index growth rate in 1997.*

But despite the effort, the results are not very encouraging. At this point questions like these may arise:

> *- If there is good will on the side of the pupils and the Ministry of Education, why is it that achievement in secondary schools is still so low?*
>
> *- Could it be that the methods of policy implementations are not appropriately selected?*

As the country was trying to find the answers to these questions, alas Eritrea was faced with a new challenge. The challenge was the border conflict with Ethiopia, which erupted in May 1998. This has diverted the attention of the nation from Education and technological advancement to concentrate on defence, which has become its priority for the last three years and to a certain degree, still remains its priority, thus less attention is given to education at the moment.

Despite the efforts made by the Ministry of Education since independence, not many pupils have met the requirements to join the University of Asmara. Besides, as will be

noted from the figures in the table 3, only an extremely small number of female pupils, ranging from 11 to 18% have enrolled as compared to their male counter parts.

**Table 3**

***The University of Asmara: Freshman Student Enrolment by year.***

| *Semester I* | *Male* | *Female* | *Total* |
|---|---|---|---|
| *1993/94* | *407 (89%)* | *46 (11%)* | *453* |
| *1994/95* | *691 (84%)* | *131 (16%)* | *822* |
| *1995/96* | *Not available* | *Not available* | *Not available* |
| *1996/97* | *812 (94%)* | *49 (6%)* | *861* |
| *1997/98* | *736 (83%)* | *153 (17%)* | *889* |
| *1998/99* | *1004 (82%)* | *223 (18%)* | *1227* |

**Source:** ***The University of Asmara, Programming and Statistics Office***

Observing the above figures, I question why fewer girls than boys obtain passing marks? Eritrean children (boys and girls) start elementary school almost equal in number (Eritrea Basic Education Statistics 1996/1997), but as their ages and grades increase, the number of girls starts to decrease gradually (see table 4 . With every year that passes, more girls drop out of school. By the time they are ready to sit for the ESECE, they make up only about 1/3 of the student population and by the time they get to the University and graduate, their number continues to decrease.

***Table 4***

***Secondary school pupils' enrolment, Grades 8-11 1996/97***

| Grade | Female | Total |
|---|---|---|
| 8 | 7,204 (45%) | 16,188 |
| 9 | 4,227 (40%) | 10,533 |
| 10 | 3,070 (37%) | 8,258 |
| 11 | 1,831 (33%) | 5,615 |
| Total | 16,332 (38.7%) | 40,594 |

***Source: Ministry of Education***

***NB: These are one-year figures but reflect the general trend of the previous years as well.***

Earlier in this chapter, it was pointed out that the number of girls was less that boys and so this table shows the total number of secondary school pupils and the percent of the female candidates (at the vigil) of the national examinations.

***Table 5***

***University of Asmara Educational Testing Centre Female's ESECE, candidates by year***

| *Academic year* | *Total candidates* | *Females* | *Percent* |
|---|---|---|---|
| 1992/93 | 10,790 | 3,120 | 28.44 |
| 1993/94 | 8,497 | 2,267 | 26.74 |
| 1994/95 | 5,514 | 1,583 | 28.71 |
| 1995/96 | 6,238 | 1,813 | 29.06 |
| 1996/97 | 7,334 | 2,300 | 31.36 |
| 1997/98 | 7,925 | 2,259 | 28.51 |
| 1998/99 | 8,368 | 2,846 | 34.23 |

***Source: Asmara Testing Centre***

Although there may be several reasons for the female's dropout, repetition and low participation in secondary schools, it is believed that some of the girls are forced to marry before they complete their secondary education. Others interrupt their education to help their families' various needs. Still others dropout of school because they find the studies too hard to keep up with and they are not encouraged to study harder. A research, on Education Wastage for Eritrean girls (at elementary level), was conducted by UNESCO/Norway project (Asmara 1995), and in that study it is suggested that family/home environmental factors, rather than in school factors, were seen as major causes for girls academic weakness and withdrawal. Although in school factors, such as messages conveyed by some teachers may play important roles at times. As a consequence of the factors mentioned above, girls' numbers decrease as their ages and grades increase. Table 3 showed the number of girls who are admitted to the University yearly and the figures in the table below show how many of them graduate in the end.

***Table 6***

***Graduates of the University of Asmara by years***

| *Year* | *Total* | *Females* | |
|---|---|---|---|
| | | *Number* | *%* |
| *1992/93* | *191* | *46* | *24* |
| *1993/94* | *126* | *45* | *36* |
| *1994/95* | *278* | *54* | *19* |
| *1995/96* | *533* | *93* | *17* |
| *1996/97* | *590* | *66* | *11* |

***Source: University of Asmara***

## *4. Eritrean Secondary Schools*

### 4.1 Physical buildings

School buildings in Eritrea can be classified by the period in which they were built. These periods are:

- Between 1930-1960s
- In the 1970s
- In the 1990s

No schools were built between 1970-1990, at least in the areas under the occupation of the Ethiopian administration. Architecturally, the different schools reflect the period in which they were built. Those which were built prior to the 1970s may need some repair, otherwise, they have been maintained quite well. These schools, probably because they were built by Italian engineers, are all Italian style. Many of these schools are in the capital (Asmara) and they may have one or two floors. However, the schools built from the 1970 onward are all plain ground floor constructions, occupying wide spaces.

Moreover, these (newer) schools are very similar to each other. They are functional, but do not have any architectural beauty. They are just row block constructions and the material they are built with does not look very strong. Unlike the pre 1970s, buildings, they show their age despite their being relatively new. Even though some work was done on them after independence to make them more functional, it goes with out saying that all of these schools still need repairs.

All schools in Eritrea have big signs, in three different scripts, indicating their names and level of the school. The scripts are in Latin, Geez and Arabic and the languages in the scripts are English, Tigrigna and Arabic. If a guest approaches a school building, he/she will be welcomed by a waving Eritrean Flag. The flag is usually placed near the school gates or in the middle of the school compound. Pupils gather for the morning assembly to salute and to raise it up by singing the national anthem and in the evenings before departing from the school, they gather again to salute it and to bring it down to rest for the night.

Another thing, which catches the attention of a visitor to a school, is the director's office, which is usually situated either near the gate or in the centre of the buildings, with other offices and/or classrooms on its right and left hand sides. Furthermore, many of the schools, even those that need restoration, have some very attractive and colourful welcoming oil or acrylic paintings on the outside walls. The paintings usually depict some human organs, such as an eye, ear, heart, lungs, liver, or human skeleton. However, not all schools choose human organs. Some schools may choose to paint a life cycle of a tree, starting from seed germination and showing the entire cycle process. Still others may choose to paint some thing related to geography. This may include the maps of Eritrea, Africa or the world.

### 4.2 Classrooms

The number of pupils in a class range from 14-78, but the largest number was found in the 40-49 range. This suggests that class size is a problem, since it is difficult for a teacher to monitor effectively a class more than 50 and especially the 25% of the classes with more than 60 students; *(*Ogubazghi & Holmes 1998: 21). The figures above reflect the situation of at least two years prior to this research, which was in 1999/00. Class sizes in this study were found to be even larger than what is indicated above. Most classrooms are built to accommodate about 40 students, however, due to shortage of

schools most of them are found to contain twice their capacity; in fact four times their capacity because students come in two shifts.

The first shift comes in the morning and remains in school from 7: 30 a.m. to 12:15 p.m. and the second shift from 12:30 p.m. to 5:15 p.m. The morning shift pupils go home in the afternoon but the teachers stay behind to serve the afternoon shifts. Classrooms usually have only the basics i.e. a medium sized built in blackboard in the middle of the front wall, a teacher's table with a chair and the pupils' desks. With the exception of very few classrooms, which may have some teaching aids, usually there is nothing hanging on the classroom walls for either decoration or as teaching aids. Most schools suffer from shortage of resources for teaching effectively. All they have is usually very limited amount of textbooks, few reference books in the libraries and the lucky ones may have some chemicals and apparatus for their science laboratories.

### 4.3 School compound

Most school compounds are spacious to allow the students to play foot-ball, basket-ball or any other games they organise for themselves. The compounds are usually fenced either with stone or brick walls, which are high enough to give the students privacy. However, not all schools are fenced with walls. Most of the newer schools have wired-net fences rather than the brick walls. In general Eritrean schools have one or two gates which may be kept closed when students are inside the school buildings. However, there will be gate keepers (usually retired men) who would allow visitors free movement, but prevent students, unless they have permission from the school director or their teachers for going in and out. Some school compounds, especially those with easy access to water, may display some beautiful flowers all year round, however these are extremely few since many suffer from shortage of water.

### 4.4 Pupils

Secondary school pupils can be categorised into two groups, i.e. the junior secondary and senior secondary. Usually these groups are separated but in some places they may share the same compound. In the schools where both juniors and seniors attend, some pupils may be as young as 12 years old; however, in separated schools the age of the senior secondary may be 14 years and above. All Eritrean pupils wear school uniforms; however, the uniforms portray different colours for each school.

## 4.5 Teachers

Secondary school teachers are mostly Eritrean young men, fewer Eritrean young women and some expatriates from India, the Philippines, a smaller number of Voluntary Service Overseas (VSO) from the UK, Peace corps from the US and possibly some volunteers from Australia. Most secondary school teachers are between the age range of 25-44. Teachers in the senior secondary schools are qualified, i.e. they have a minimum qualification of BA or BSc. The table below indicates the number of secondary school teachers.

Table 7

***Eritrean Secondary school teachers by gender***

| *Sex* | *Male* | *Female* |
|---|---|---|
| *Number of teachers* | *1692* | *226* |

***Source: Extracted from the Basic Education statistics 1997/98***

## *5 Eritrea's challenges*

The key challenges which Eritrea faces are the dichotomy between the need to widen access for educational opportunities for all and the need to improve the quality of education. At all levels of its education system there is the mismatch between access for educational opportunity and at the same time, improving the quality of education. The needs are evident, but the economic situation of the country and the availability of the labour market for the candidates after their graduation dictate the amount of material that can be obtained to bring any substantial improvement.

Various attempts have been made to improve the quality of education in the last seven to eight years and a lot of encouraging achievement has been recorded since independence. Intensive seminars have been conducted to raise awareness about education and to enable parents to play vital role in the education of their children. For example parents have become more concerned about their children at school. Teachers have also been given in service courses intended to improve their teaching methodology. In short, the overall drive for education has been focused on "basic education" with the intention of making the children at their formative years good at mathematics, English and science. These views are strengthened by the reflections of the Minister of Education (Eritrea Profile, Sept. 19 1998):

> *Based on the demand of the people for education, the Ministry is opening new schools in convenient places where they could serve as centres. At the moment,*

*one school serves three villages. In order to provide even educational opportunities in the country, schools are being opened in all regions of the nation, and 52 new schools have started teaching in the 1997/98 academic year. Of these schools, 38 are elementary, 12 junior and 2 high schools. In 1998-99 academic year, however, the number of schools that we can open, are less, because of shortage of man-power and resources. ... This year's (1998) results of the students who sat for the grade 7 national examination as well as the Eritrean General Certificate Examination (EGCE) is the best after liberation. This is the result of cumulative efforts that have been exerted during the past seven years. The quality of education is improving gradually. The results scored by our candidates this year are satisfactory. However, a lot remains to be done to arrive at the standard we aspire to achieve. Most of our students are still weak in Mathematics and efforts are required to improve in this respect.*

The research for improving quality and relevance of the education provided is intensified through undertaking research provision of in-service programs for the teaching and non teaching staff, purchase of facilities and the recruitment of expatriate teachers.

### 5.1 Human Resource

The prime objective of the Eritrean government is to develop its human resources through education. Over all the aim is to adopt a planned and coherent approach to improve organisational effectiveness. The variations of human capital theories in this section are included here in the hope that they will help to explain Eritrean government's policy, which believes in investing in its people, especially in its youth, because they are the only available natural capital or resource the country has at hand. Human resource, according to Harris et al. (1994: 2), and Armstrong (1999: 215), is concerned with planning and implementation of programmes designed to enhance the effectiveness with which an organisation functions and responds to change. An effective organisation can be defined broadly as one that achieves its purposes by meeting the needs of its stakeholders, matching its resources to opportunities, adapting flexibly to environmental changes and creating a culture that promotes commitment, creativity, shared values and mutual trust. For Bramham (1994:115) human resource or manpower planning may be defined as a process whereby courses of action are determined in advance and continually updated.

### 5.2 Research

All Ministry of Education department branches, offices and units have been undertaking numerous research studies during the few years after independence. The major break-through was the modest exercises made in preparing various policy guidelines for most

sub-sectors of the Ministry. Further more enrichment of all policy and strategy guidelines is also in progress.

### 5.3 Capacity building

Various short and long term training programmes, both in and outside the country, have been provided for teaching and non-teaching staff since independence. For example from 1992 to 1998 the latest year of which data is available, the following teaching and administration staff have received training in the country:

- *2005 elementary school teachers have undergone pre-service training at the Asmara Teacher Training Institute (ATTI) and the University of Asmara.*
- *216 elementary school teachers have taken English language training since 1995/96.*
- *189 school directors and supervisors have already completed the required training during the summers of 1993-1995.*
- *Another group of 201 school directors and supervisors are taking similar training programmes under the auspices of the Ministry of Education and the University of Bristol Partnership Link.*
- *190 pre-school teachers have under gone training.*

Moreover the following have had training abroad:

- *More than 100 staff members have undergone short, medium and long term training programmes abroad since 1992, and currently, 39 Ministry of Education staff are following Masters programme abroad.*
- *74 junior and secondary school English language teachers have attended a 3 months training programme on language, methodology, and material development in U.K.*
- *More than 100 university staff have been granted scholarships to upgrade their knowledge and attain MA and/Ph.D degrees overseas.*
- *The University of Asmara has a plan of expanding itself in several towns, one of which is to undertake one-year foundation courses for potential entrants to the university's science faculties.*

All these are very good and necessary for the improvement of the country's education in the various levels but there does not seem to have been any capacity building in equal opportunity to bridge the gap of academic achievement between males and females.

### 5.4 Support system

Head-quarters as well as the regional education offices, are from time-to-time getting equipped with the necessary modern facilities. Libraries and resource centre facilities are not only increasing in number but also slowly developing in quality.

Despite these encouraging availability of the necessary modern facilities presented above, many secondary schools as will be presented in chapters 5, 6 and 7, have no

suitable supplies or equipment in their school to enable them to use their science laboratories and the school libraries effectively.

### 5.5 Expatriate teachers

During the last few years, after independence, efforts to expand the pool of qualified middle and secondary school teachers have been made by recruiting and involving expatriates from abroad. There are now well over 200 expatriate teachers (mostly Indians) deployed in secondary schools. Each expatriate teacher is expected to transfer his/her teaching capability to an Eritrean counterpart during his/her stay in the country. But as will be noted in chapter 5, many of the expatriate teachers are not as helpful as the students wish them to be.

## *6. Rationale for the research*

The gap of academic achievement increases as the age and grades of Eritrean boys and girls increase. Eritrean children (boys and girls) start elementary school, grades 1-5, together in which both sexes perform equally and in some subjects, girls perform better than the boys do. When they get to junior secondary schools, grades 6 - 7, girls start to lag behind boys. If they continue in the senior secondary schools, grades 8-11, a sharp contrast is noticed in the overall performance, where boys outperform girls, and as a consequence only a very small percent of the latter enters the university. For example the overall gender distribution of the student population in the University of Asmara, in May 1997 was 2444 but only 234 (9.6%) were females. (See table below).

Table 8

***Overall gender distribution, university of Asmara, May 1997***

| *Female* | | *Male* | | *Total* | |
|---|---|---|---|---|---|
| *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* |
| *234* | *9.6* | *2210* | *90.4* | *2444* | *100* |

***Source: University of Asmara***

Fewer and fewer female students manage to continue in higher educational level in today's Eritrea. This can be verified with the Ministry of Education's statistical annual reports 1991-98 in the following tables.

**Table 9**

***Percentage of repeaters***

| *Year* | *Enrolment in secondary level* | | | *Repeaters* | | | *Percentage of repeaters* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Total* | *Male* | *Female* | *Total* | *Male* | *Female* | *Total* | *Male* | *Female* |
| 1991/92 | 27,627 | 14,281 | 13,346 | 11,072 | 4,241 | 6,831 | 40.1 | 29.7 | 51.2 |
| 1992/93 | 31,531 | 17,141 | 14,390 | 11,426 | 4,341 | 7,085 | 36.2 | 25.3 | 49.2 |
| 1993/94 | 32,756 | 19,432 | 13,324 | 7,504 | 3,212 | 4,292 | 22.9 | 16.5 | 32.2 |
| 1994/95 | 36,728 | 22,097 | 14,631 | 6,182 | 2,704 | 3,478 | 16.8 | 12.2 | 23.8 |
| 1995/96 | 39,188 | 23,713 | 15,475 | 7,296 | 3,113 | 4,183 | 18.6 | 13.1 | 27.0 |
| 1996/97 | 40,594 | 24,262 | 16,417 | 16,332 | 7,135 | 3.272 | 17.6 | 13.5 | 23.7 |
| 1997/98 | 41,615 | 25,198 | 16,417 | 16,417 | 7,648 | 3,305 | 18.4 | 13.1 | 26.4 |

***Source: Eritrea: Essential Education Indicators 1997/98***

Table 10

***Flow rates by gender and grade***

| *Grade* | *Withdrawal* | | *Repeating* | | *Promotion* | |
|---|---|---|---|---|---|---|
| | *Male %* | *Female %* | *Male %* | *Female %* | *Male %* | *Female %* |
| *1* | *8.42* | *7.88* | *27.59* | *29.50* | *63.99* | *62.62* |
| *2* | *5.51* | *5.31* | *17.16* | *18.49* | *77.34* | *76.20* |
| *3* | *5.39* | *4.77* | *18.81* | *22.12* | *75.80* | *73.11* |
| *4* | *6.46* | *5.99* | *20.22* | *23.25* | *73.32* | *70.76* |
| *5* | *6.90* | *6.42* | *13.12* | *19.92* | *79.98* | *73.66* |
| *6* | *8.66* | *7.48* | *14.86* | *28.79* | *76.47* | *63.73* |
| *7* | *6.56* | *7.18* | *8.81* | *20.17* | *84.62* | *72.64* |
| *8* | *9.23* | *8.63* | *21.08* | *36.02* | *69.69* | *55.36* |
| *9* | *8.42* | *6.94* | *17.95* | *31.23* | *73.63* | *61.83* |
| *10* | *7.16* | *7.16* | *14.13* | *30.34* | *78.71* | *6.50* |
| *Total* | *7.08* | *6.54* | *18.13* | *24.34* | *74.18* | *68.85* |

***Source: Essential education indicators, 1997/98, Ministry of Education***

In virtually every positive educational indicator and virtually every level, females lag behind males. For example, in 1997 while 925 (18.3%) males passed the ESECE, only 159 (6.9%) females did. Of the 1037 secondary school teachers in Eritrea in 1997, only 103 (9.9 %) were female. Even in government elementary schools (grade 1-5) women made up only 34% of the teachers. The gender disparity in the University of Asmara also reflects the nature of Eritrean society. Of the 590 who graduated in 1998 only 66 (11%) were women. In (1997/98) only 6 of 48 (13%) staff holding doctorate degree were women. Of the total teaching staff of 166 only 26 (15.7%) were women. Besides the academic disparity, there is no equal representation of females in the upper grades, especially at the Teacher Training Institute and at the university level as the table below shows.

Table 11

*Eritrean school teachers gender and qualification*

| *Teachers* | *Teacher Training Institute (TTI)* | | *University* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *12+1* | | *12+2* | | *12+3* | | *BA* | | *MA* | |
| *Sex* | *M* | *F* | *M* | *F* | *M* | *F* | *M* | *F* | *M* | *F* | *M* | *F* |
| *Elementary* | *2318* | *1184* | *31* | *13* | *15* | *-* | *3* | *-* | *25* | *-* | *5* | *-* |
| *Junior secondary* | *279* | *34* | *175* | *26* | *213* | *58* | *13* | *2* | *91* | *34* | *5* | *-* |
| *Senior secondary* | *16* | *-* | *13* | *2* | *156* | *24* | *50* | *1* | *497* | *59* | *101* | *25* |
| *Total* | *2613* | *1234* | *201* | *41* | *384* | *82* | *66* | *3* | *613* | *93* | *111* | *25* |

***Source: Extracted from Basic Educational Statistics 1997/98, Ministry of Education***

As indicated above, since independence (1991), most educational indicators have shown yearly improvements; however, the improvements are not very encouraging especially for girls. A quick look at any basic statistics may show that the goal of a quality 'education for all' children, at least through secondary education, will require vast effort and improvement. A major obstacle to overcome is gender disparity in academic achievement and withdrawal from schools.

There has been progress in attaining equality in some areas of the educational system in Eritrea. For example the Basic Education Statistics, Ministry of Education, shows that the total number of girls in 1997/98 as compared to 1996/97 increased by 4.8 %. Furthermore the document reports that as compared to 1996/97, the national enrolment of girls and boys has increased; however, the participation of girls is still lower than that of boys. Despite the increasing number of pupils' enrolment in Eritrean education, girls continue to be dramatically under-represented in academic achievement in general and in science in particular. Therefore, attaining gender equality in and through education would mean achieving equitable outcomes for both males and females in educational achievement. See tables below for the detail of the student withdrawing from school and repeating classes:

***Tables 12 a-c***

***Elementary level***

| *Grade* | *Withdrawal* | | | *Repeating* | | | *Pormotion* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Male %* | *Fem.%* | *Total* | *Male %* | *Fem.%* | *Total* | *Male %* | *Fem.%* | *Total* |
| *1* | *8.42* | *7.88* | *8.18* | *27.59* | *29.50* | *18.44* | *63.99* | *62.62* | *63.38* |
| *2* | *5.51* | *5.31* | *5.42* | *17.16* | *18.49* | *17.76* | *77.34* | *76.20* | *76.82* |
| *3* | *5.39* | *4.77* | *5.10* | *18.81* | *22.12* | *20.34* | *75.80* | *73.11* | *74.56* |
| *4* | *6.46* | *5.99* | *6.25* | *20.22* | *23.25* | *21.59* | *73.32* | *70.76* | *72.17* |
| *5* | *6.90* | *6.42* | *6.69* | *13.12* | *19.92* | *16.11* | *79.98* | *73.66* | *77.20* |
| *Total* | *6.70* | *6.20* | *6.47* | *20.36* | *23.33* | *21.69* | *72.95* | *70.47* | *71.84* |

*Middle level*

| Grade | Withdrawal | | | Repeating | | | Pormotion | | |
|---|---|---|---|---|---|---|---|---|---|
| | Male % | Fem.% | Total | Male % | Fem.% | Total | Male % | Fem.% | Total |
| 6 | 8.66 | 7.48 | 8.17 | 14.86 | 28.79 | 20.74 | 76.47 | 63.73 | 71.09 |
| 7 | 6.56 | 7.18 | 6.83 | 8.81 | 20.17 | 13.64 | 84.62 | 72.64 | 79.53 |
| Total | 7.77 | 7.35 | 7.60 | 12.29 | 25.11 | 17.72 | 79.93 | 67.54 | 74.69 |

*Secondary level*

| Grade | Withdrawal | | | Repeating | | | Pormotion | | |
|---|---|---|---|---|---|---|---|---|---|
| | Male % | Fem.% | Total | Male % | Fem.% | Total | Male % | Fem.% | Total |
| 8 | 9.23 | 8.63 | 8.97 | 21.08 | 36.02 | 27.45 | 69.69 | 55.36 | 63.58 |
| 9 | 8.42 | 6.94 | 7.82 | 17.95 | 31.23 | 23.32 | 73.63 | 61.83 | 68.86 |
| 10 | 7.16 | 7.16 | 7.16 | 14.13 | 30.34 | 20.43 | 78.71 | 62.50 | 72.42 |
| Total | 8.46 | 7.77 | 8.18 | 18.37 | 33.24 | 24.48 | 73.17 | 58.99 | 67.35 |

*Source: Ministry of Education*

Inequality in academic attainment between male and female pupils merits exploration. Although there is a substantial evidence of differences in male and female pupils' experience in secondary school education, little is known about how Eritrean pupils, teachers, parents and university students interpret these differences. Over all the figures in this chapter indicate that there are far too few females in the higher education sector and this further reduces the influence of women in science within and beyond education.

## *7. Summary*

The objective of this chapter is to introduce and familiarise the reader with Eritrea's history of formal education, its contemporary challenges, its current secondary schools' situation and its (educational) human resources.

In traditional Eritrea, before the 1880s, the start of the Italian occupation, formal education was established for religious purposes. Education fitted the young for their roles in the communal life. Italian colonialism brought limited modern education to Eritrea and male Eritreans received education up to a fourth-grade level. There were also Catholic and Protestant missionary schools which largely excluded females. In this period (1880-1942) primary education was minimal, since the Italians were convinced that higher education might inculcate in Eritreans an anti-colonial out look.
With the change of government occurring in 1952, when Eritrea was federated with Ethiopia, there was a determined advance in education and the first secondary schools

were opened in 1956. From 1952-1974, Eritrea was controlled by Emperor Haileselassie of Ethiopia, who encouraged education both in the towns and villages.

Aware of the neglect education has suffered under successive colonial governments, the current Eritrean government had declared a policy of basic education for all. This, which embraces an element of equal educational opportunities, allows every Eritrean citizen the right to education, which is compulsory up to the intermediate school level.

The school system in Eritrea is: five years of elementary, two years of junior secondary, four years of senior secondary and four years of University education. In the last year of their senior secondary education, pupils take national standard exams (ESECE) in English and Mathematics, which are mandatory subjects and three or more subjects of their choice from their majors. In Eritrea, education is free, i.e. the state covers all the expenses including the boarding for some junior and senior secondary schools, the Teacher Training Institute (TTI) and the University of Asmara.

At all levels of its education system there is the mismatch between access for educational opportunity and at the same time improving the quality of education. The gap of academic achievement in creases as the age and grades of Eritrean boys and girls increase. Eritrean children (boys and girls) start elementary school, grades 1-5, together in which both sexes perform equally and in some subjects, girls perform better than boys do but as they grow up, in virtually every positive educational indicators and virtually every level, females lag behind males.

The prime objective of the Eritrean government is to develop its human resources through education, thus it is investing a lot of money of educating people to improve education in the country.

## *8. Conclusion*

This chapter has introduced the reader to the country, Eritrea, demonstrating its geographical location, population, economy, school buildings and school resources. It

has given an overview of Eritrean's history of formal education, starting from the pre-colonial period to the present. Furthermore it discussed the schools, pupils, and teachers' characteristics. It explained about the school system, its contemporary educational challenges, and its human resource development. Now that the reader is familiarised with the Eritrean context, the next chapter will take us to the methodology used in conducting the research.

## *Chapter Four*

## *1. Research Methodology*

### *1.1 Introduction*

This chapter deals with the research design and aims of the study, whilst illustrating the procedure followed, the instruments used in collecting the data and why the latter were selected. It also shows how and why the sample was selected, the questionnaires and interview questions piloted, administered and analysed.

Planning of this research project was done on the bases of organising the information framework. Thus it is used as a means of exploring the application of the literature, defining the theoretical framework, identifying research questions, the variables, and to a certain degree, to choose the appropriate approaches to the research. The implications of quantitative and qualitative research design are critically evaluated. Furthermore, issues such as the identification of subjects or population, heterogeneity of participants, appropriateness of sampling techniques, ethics, reliability and validity are examined for data collection. Data analysis and interpretation issues are discussed in terms of appropriateness of the techniques and in the end contribution are explored in terms of methodological substantive issues.

## *2. The Research Questions and aims*

1. *Why does the achievement gap in Eritrean secondary school boys and girls increase as their ages and grades increase?*
2. *What factors produce the difference in boys' and girls' academic performance in Eritrean secondary schools, especially, in science?*
3. *To what extent are pupils' attitude and confidence in learning science subjects, and their consequent success affected by gender?*
4. *What part do teachers' attitudes play in the performance of girls in sciences?*
5. *Is there a relationship between parental educational level and the child's achievement?*
6. *Do parents generally expect less of their daughters than of their sons in science education?*
7. *Does Eritrean society encourage boys and girls to achieve in secondary education especially in the area of science?*

The aims of this study are:

1. *To explore reasons for gender disparities in achievement in Eritrean secondary science*
2. *To identify Eritrean pupils', particularly girls' constraints in science learning.*

This study also attempts to undertake the following distinct tasks namely to:

- *examine hypotheses and development of sex differences in science achievement*
- *suggest ways of reducing sex difference in achievement and to improve girls' academic performance.*

### *3. Interpretative theory*

In the hope of being able to find answers to the questions of the study and to undertake the tasks indicated, this study followed an interpretative theoretical approach and used mixed methods in collecting its data. The purpose of the study is both to describe and explain.

An explanatory theory is one which, not only describes but also explains the phenomenon of substantive interest. Thus, theory, in this sense is a set of propositions, which together describe and explain the phenomenon being studied. According to Punch (2000: 38) descriptive study sets out to collect, organise and summarise information about the matter being studied. It often involves summarising specific factual information into empirical generalisations, or summarising details of events, characteristics, cases or processes. An explanatory study, on the other hand, sets out to explain and account for the descriptive information. It too is concerned with making complicated things understandable, but on a different level. It aims to find the reasons for things, showing why and how they are what they are.

One way to see the differences between description and explanations is to compare 'what' questions with 'why' and 'how' questions. A descriptive study asks basically what the case or situation is and explanatory study asks why the case or situation is. On description-explanation distinction research, (Maxwell 1996: 59) has a third category of questions, which are known as interpretative questions. Descriptive questions ask 'what'? Explanatory questions ask 'why' questions and interpretative questions ask 'about the meaning of things for the people involved'. I opted for the interpretative approach; I therefore tried to ask what and why questions with the intent to be able to interpret the meaning of the responses.

### *4. Research procedure*

***Phase I***

This phase consisted of review of literature, the planning of the research activities, and the development of research instruments. The work initiated with the library staff giving us (new candidates) orientation on what was available in the library, how to use the available resources, how to obtain other books and/or journals not available in the library and obtain them through inter library loan.

The next step was searching through the library catalogue around the relevant topics of interest. Initially the literature was reviewed in a piecemeal manner because at the beginning the aim was to gain a feel of the research relevant to the study. Later on, the review of the literature provided guidelines for designing the research instruments and gradually the study became more focused. The work proceeded with the reviewing of various books on methods of educational research and with journals containing topics of interest. I then reviewed archives of dissertations of former Ph.D. students and the computer search facility for users to find specific terms including the British Educational Index and the Educational Resources Information Centre (ERIC). The search of these resources was followed by the auditing of (research methodology) master's program courses, discussion/negotiation about the research topic with the academic advisor and other academic professionals, last, the preparation of the instruments for the study were completed.

***Phase II***

When the instruments were ready, I went to Eritrea to collect the data from the secondary schools and the University of Asmara. To carry out researches in Eritrean schools, permission from the representative offices of the Ministry of Education or the Ministry of Education itself was required. Accordingly, the first thing I did was to secure letters from the Ministry of Education indicating that permission to carry out the research had been granted. The letters also gave me access to some data sources within the Ministry and at its regional offices. Copies of the letters are included in appendix 3.

***Phase III***

This phase consisted of the testing and duplicating of the questionnaires prior to the commencement of school visits. Once the instruments were piloted and corrections made, I went to the University of Asmara and duplicated the questionnaires for all the

participants. The next major task during this phase was to establish contact with the schools selected for the study. The purposes of these contacts were not only to schedule visits, but also to explain the objectives of the research; accordingly, I was able to do all these activities after which I started my field work in the schools.

***Phase IV***

This last stage consisted of the administering the questionnaires and the interviews, assembling and analysing of the data and the writing up of the thesis. This phase was not only the longest but also the most challenging. I have collected so much data that it took me a very long time to assemble and classify the content in categories. Assembling the pupil's data was the most time consuming since beside their being a large number of pupils who participated in the study, the questions asked were far too many. The other participants' questionnaires were less in number and the questions asked were less, therefore, they were less time consuming and less-complicated in comparison to those of the pupils. Assembling the interview responses and classifying them according to the categories took me many long days, which seemed to never end. However what took most time and energy and, above all, seemed never to come to an end, was the writing up of the thesis.

## 4.1 Quantitative and qualitative methods

I have chosen to integrate both quantitative and qualitative methods in this study for the simple reason that social science researchers have a variety of options and alternatives to follow when conducting researches. This means that there is no single 'perfect' strategy for social science research, because each strategy has its own strengths and limitations. Therefore, a researcher has to make his/her strategic decisions on the basis of time, distance, scope and nature of the study, and the resources available. Besides, the questions a researcher raises, can affect the method one employs, since some questions can only be answered using the quantitative method, while others are best asked via the qualitative approach. But it can also work the other way round, that is, to propose certain methods, is to imply certain types of questions. Thus method can also affect questions. However, the important thing according to (Punch 1998: 244) is the matching of questions with methods – using quantitative methods for quantitative questions, and qualitative methods for qualitative questions.

These approaches were chosen in order to increase the scope, depth and power of the research. I tried to generate hypotheses and theories as to why there is the pattern of

achievement difference in secondary science; hence, although data was collected mostly by means of quantitative instruments, these were followed by qualitative approaches. Quantitative research is thought to be more concerned with the deductive testing of hypothesis and theories, whereas qualitative research is more concerned with exploring a topic, and with inductively generating hypothesis and theories, (Ibid. 240). While quantitative research may be mostly used for testing theory, it can also be used for exploring an area and for generating hypotheses and theory.

At a general level, combining the two approaches implied the need to capitalise on the strengths of the two, and compensate for the weaknesses of each approach. At the same time, the specific reasons for combining the approaches should be considered in particular situations in the light of the practical circumstances and context of the research. Consequently (Punch 1998) notes that there are issues that need consideration which are first to respond to the question of meaning of the term combining. Since the possibilities include adding one approach on to the other, interweaving or integrating, the two approaches are points, which need consideration. These different meanings lead to different models for combining the two approaches, some of which are considered below. Second, there is the distinction between combining methods, combining data and combining findings. Combining findings (which is what I have used in this study) means that the two types of data are brought together during the analysis in order to contribute to the findings. At the more complex end, studies, which combine methods, data and findings can be described as full multi-method studies. Based on these theories, I have planned my research instruments and collected the data.

There are many ways of combining the two methods of data collection, for example in qualitative research unstructured interviews and participant observation are sometimes quantified, i.e. items are quantified and analysed with computers. Here quantification acts as a means of summarising qualitative material, as an alternative to a more intermediate presentation of the data. However this is not an integration of quantitative and qualitative research. Another example may be structured interviews and self-administered questionnaires, which are conveniently associated with quantitative approach but at times include open-ended style, (normally associated with semi-structured interviews for qualitative research). The responses of the open-ended questions force the researcher to modify his/her conclusions. As will be explained farther, I have included several open-ended questions in the survey questionnaires and

used semi-structured interviews, therefore not only did I combine the findings of the data but also combined the quantitative and qualitative methods in this research.

A quantitative approach conceptualises reality in terms of variables, and relationships between them. It rests on measurement, therefore pre-structures data, the research questions and its conceptual frameworks. In this approach samples are typically larger than in qualitative studies and generalisation through sampling is usually important. It does not see the context as central and it has well developed and codified methods for data analysis. Its methods in general are more uni-dimensional and less variable than qualitative methods. It is therefore, more easily replicable, (Punch 1998: 243).

Qualitative approach on the other hand, deals more with cases and meaning and is not concerned with questioning to wider populations. It is sensitive to the context and process, to lived experience and to local groundedness, and the researcher tries to get closer to what is being studied. It aims for in-depth and holistic understanding, in order to do justice to the complexity of social life. Samples for this approach are usually small, and its sampling is guided by theoretical rather than probabilistic considerations. Pre-structuring of design and data is less common, and its methods are less formalised than those in the quantitative approach, moreover, they are more multi-dimentional, more diverse and less replicable; therefore, there is greater flexibility, (Ibid: 243). In conclusion, qualitative methods are the best for the insider's perspective, the participants' definition of the situation, the meaning people attach to things and events. Consequently the proposed methods of inquiry employed in this research are qualitative and quantitative in nature.

Besides the explanation given above, the reason for using a combination of the two methods is to insure validity and enrich the data. However, although both methods were employed, questionnaires are considered the main tools for this study. For the quantitative method survey questionnaires, subjective and objective, Likert type, and open-ended items, were designed, piloted and administered to secondary school: directors, science teachers, pupils, secondary school children's parents, and university students. In the case of the qualitative method, open-ended interview questions were set and administered to the pupils, teachers and parents. The responses of both the questionnaires and the interviews were coded and the results transcribed, they were then interpreted by rating and ranking them. The work for the questionnaires and the interviews was organised by categories and in the end the findings were combined.

Qualitative and quantitative methods were chosen keeping in mind that they are not simply different ways of doing the same thing. Instead, they have different strengths and logic, which are often best used to address different questions and purposes. The strength of a qualitative research derives primarily from its inductive approach, its focus on the specific situation or people, and its emphasis on words rather than numbers. Therefore, even though most of the data for the study was obtained from the questionnaires, several of these questions were open-ended, which were then assembled and interpreted; hence, the approach is inductive and follows the principle of the interpretative theory.

Inductive analysis according to (Coolican 1994: 173) involves the process of constantly refining emergent categories and models in the light of incoming data. The value of this approach is particularly seen in its ability to permit categories, processes, and the emerging hypothesis, which might not have been envisaged before research began. (Hitchrock & Hughes 1989: 297) also noted that a qualitative data researcher comes to the formal stage of data analysis, having passed through much informal data analysis. This is quite important since it can provide the researcher with clues, ideas and general lines of questioning to follow up, which is precisely what I have tried to do with the interview data.

Questionnaires and interviews, are used by researchers to convert into data the information directly given by a person, (Tuckman 1994: 216). Hence questionnaires and interviews are ways of getting data from people by asking them rather than by observing and sampling their behaviour. However, the self-report approach incorporated in questionnaires and interviews may present certain problems because as (Tuckman 1994) points out:

1. *respondents must co-operate when completing questionnaires or interviews;*
2. *they must tell what it is rather than what they think it ought to be or what they think the researcher would like to hear; and*
3. *they must know what they feel and think in order to report it.*

Here the technique used to measure the views of the participants were, both close and open-ended survey questions and semi-structured open-ended interviews. These include:

1. *problems encountered by Eritrean secondary school pupils, and*
2. *factors contributing to gender difference in secondary science achievement*

The discussion up to this point focused on quantitative and qualitative approaches simultaneously, but now I will try to present them separately and in more detail.

### 4.2 Quantitative (survey) methods

Quantitative methods are systematic and economical methods of collecting data to cover a variety of themes, on the other hand, questionnaires can be perceived as invasion of privacy and even as potentially threatening to the respondents. Open-ended questions in quantitative methods can yield vivid and pertinent comments, but the responses given can be difficult to code and classify.

A **survey** is a research activity in which data are collected from part of a group for the purpose of describing one or more characteristics of the whole group. In other words a representative sample of a population is asked questions about something and the results are generalised back to that population. These according to (Jaeger 1988) are used when a researcher wants specific information from a large number of individuals. Therefore, the purpose of a survey is to gather information from as many people as possible; however, in reaching so many people it isn't possible to go into details and bits of information. To achieve high levels of reliability and validity the best surveys ask people for information about current events, current behaviour or current attitude, which is what I have tried to do in this study. Hence the purpose was to include as many persons as possible and then generalise the views of the representative samples back to the general population; therefore, this study used survey questionnaires as its primary tools for the data collection.

There are several ways of carrying out surveys using questionnaires. These are postal questionnaires, telephone questionnaires, group questionnaires and face to face questionnaires. Group administered questionnaires are both economical and have a high response rate. They can be used in survey situations where respondents are able to gather into groups; e.g. students in classrooms. Face to face questionnaire are another form of survey data collection method, which has the highest response rate but costs the most. This type is good because it assures that the respondents have understood the questions and they can question the researcher if needs arise. Hence, this study includes integration of both the group-administered and the face to face survey methods, in

which I went to the different schools and administered the questionnaires as well as the interviews.

With the exception of two schools in which the directors said they would administer the questionnaires themselves in their convenient time, I was present when the pupils completed the questionnaires. I administered the questionnaires and remained in the classes until most participants had completed all the questions, to respond to their query in case they had any; and pupils had asked some unclear questions, which I explained. Questions asked included explanation of unfamiliar words and clarification about directions on how to respond to some question items. Mindful of the questions some of the pupils asked during the questionnaire administration, I started to worry about the possibility of obtaining different responses from the students who had to complete them on their own, thus I was extra-careful when analysing their data. However, to my surprise, I did not find any difference in the responses of these pupils. The directors, teachers, parents and university students administered the questionnaires themselves and I collected them when they were ready.

Directors', teachers' and parents' questionnaires were handed over to the directors on the first working days in the field sites. Pupils' questionnaires on the other hand, were distributed at a time when the respondents came to class to answer them. I think that my presence on the premises where the pupils' questionnaires were administered helped to obtain the high rate of the questionnaires return, which were 295/310. The few that were lost belonged to the students who were not able to complete them in the allocated time and were allowed to take them home to complete, but they never did. The rest belonged to those to whom the directors were supposed to have administered them and some pupils failed to return their papers. The university questionnaires were given to Mr. Aklilu Markos, an instructor at the University of Asmara, who was kind enough to distribute them to the students in his department and made sure that they returned them after completion. The return rate for the university students, was very high in which Aklilu was able to attain 32/33. Overall questionnaire return rate for all participants was very high, in which the directors' were 4/5, teachers' 35/39 and parents' 30/40. Having discussed about the quantitative approach and how it was implemented in this study I now will move on to discuss about the qualitative approach.

## 4.3 Qualitative (interview) Methods

Qualitative research, according to Cohen & Manion (1989: 97) can serve four distinct purposes although often several can be incorporated into a single study. First it can play a useful role in its own right where the research aim is simply to uncover the range of variables. Second, it can relieve some of the shortcomings of the normal structured approach to questionnaires by providing deeper insights into particular aspects. Third, it provides the basis for developing the structured questionnaires necessary for aggregating data. Finally it provides a means for respondents to influence the content of the study and the relative emphasis given to each aspect. Out of the four purposes discussed above, I have selected the second one, however, I did not find integration of the two approaches exactly as they were presented in the literature, especially in regard to pupils' responses. I will come back to this point in chapter five.

Qualitative research is an invaluable basis for forming ideas about behaviour, attitudes, motivations, preferences patterns and their interrelationships, which can be examined and tested in larger studies. This is precisely what I tried to do with both the open-ended questions and interviews. I have tried to use semi-structured interviews yet probed them to explain points of view because a key function of qualitative research is to go beyond an identification of the range of behaviour, to build up a series of hypothesis as to why people behave as they do. In the process I realised that conducting research is not an easy task, because the depth to which one probes the subjects is in itself a variable that must largely be determined by the way in which the information is subsequently applied and because the researcher may influence the outcome. Therefore to avoid influencing the research outcome with my pre-conceived ideas, I have tried to follow the guidelines indicated above.

Qualitative approach is concerned with process rather than simply with outcomes. Qualitative researchers can generate an understanding of contextual meanings to give insight into how the way people interpret their environment and impute meaning is culturally bound. On the other hand, there is the danger of taking things for granted what ought to be held in question, say by an insider researcher like myself.

Moreover, on the element of the researcher's influence of the outcome, (Sherman et al. 1988: 130) have these to say:

> *Since grounded research requires interpersonal interactions, the researcher must observe his/her own behaviour as well as the behaviour of his subjects. He must become aware of his own 'mind set' and 'bracketing' his own values can the researcher begin to research out and understand the world of others. 'Bracketing' refers to being aware of one's personal values and preconceptions and transcending them during the research in an effort to see a situation with a new perspective.*

On a similar line to that of Sherman et al. (Bogden and Biklen 1992) alert qualitative researchers try not to influence the outcome of their findings with their opinion, prejudice, and biases. They emphasise that the researcher's primary goal is to add to knowledge, not to pass judgement on a setting.

Ultimately the purpose of qualitative research in the use of the interview is to obtain information from the interviewees with respect to interpretations and descriptions of the meaning of the described phenomena. This means that a qualitative research must be descriptive not evaluative, although it can help at evaluation, thus to be analytic. Consequently, I have tried to listen to the views of the interviewee with attention in order to be able to understand the conditions and relationships that existed, practices that prevailed, beliefs expressed, attitudes and effects being felt in the interviewees' experience hence to analyse and interpret the situation.

At the root of an **interview** is an interest in understanding the experience of other people and the meaning they make of that experience. Being interested in other peoples' views is the key to some of the basic assumptions underlying interviewing technique. It requires that we interviewers keep our "egos" in check (Seidman 1998: 3). It necessitates that we realise we are not the centre of the world. It demands that our actions as interviewers indicate that others' stories are important. Aware of these factors, as will be explained in chapters seven and eight, I tried to maintain a neutral attitude to the responses of the participants, especially when some of them were in opposition to my views.

Interviewing provides access to the context of people's behaviour and thereby a way for researchers to understand the meaning of that behaviour. On this line (Seidman 1988: 4) writes the following:

> *A basic assumption in in-depth interviewing research is that the meaning people make of their experience. ... Interviewing allows us to put behaviour in context and provides access to understanding their action.*

With the use of the interview, I tried to find out why boys and girls choose different behaviours in-school and out-of-school. Of course there are several types of interviews, some of which are: formal, semi-formal, informal, non-directive and focused interviews. The different types of interviews may be explained as follows:

1. **Formal interview** is structured with standardised schedule. This highly structured interview is most commonly used in professional surveys.

2. In the **semi-structured interviews** the main questions are set by the interviewer to create the overall structure but prompts and probes fill in the structure. The interviewer prompts by encouraging broad coverage and probes by exploring answers in depth. These can be a mixture of closed and open questions but the interviewee has a fair degree of freedom on what to talk about, how much to say, and how to express it. In the process the interviewer can assert control when necessary.

3. **Informal interview** is conversational style centred upon key issues rather than structured questions.

4. **Non-directive interview** on the other hand, is where the interviewer takes a completely sub-ordinate role. It is usually a series of interviews in which the researcher tries to understand another person's culture.

5. **Focused interview** is the type of interview on specific respondents and in a specific context. This is usually done to test hypothesis at specific stage of research. This type lends itself to group interviews.

Of the five interview approaches described above, I have used mainly the semi-structured one (see No. 2 above), followed by the informal type (see No. 3 above) to validate the questionnaire results. The aim for these approaches is to understand the views of the participants better.

### 4.4 Checking of internal consistency (Triangulation)

As indicated earlier in this chapter, I have used combinations of methods and included a variety of participants to check internal consistency. The reason why I have included

different participants will be justified in the subsequent paragraphs. Application of triangulation had the sole purpose to overcome any possible data related weakness, enhancing the validity and richness of the data gathered. Likewise triangulation enables a researcher to investigate any phenomenon with comprehensive perspectives.

Triangulation as presented by Maxwell (1996: 76) plays a very important role in reducing limited conclusion.

> *Triangulation reduces the risk that your conclusions will reflect only the systematic bases or limitations of specific method, and it allows you to gain better assessment of the validity and generality of the explanations that you develop.*

To avoid one sided or prejudiced conclusion, it is important to use careful scrutiny and cross-checking of data, since most information is usually partial. Cross-checking helps to put bits of information to piece the whole together to create complete pictures and information from different sources may be necessary to ensure consistency and agreement between sources of information. Therefore, validation of clear picture can often be constructed based on a collection of apparently unconnected sources of information. On the issue of validation (Pratt & Loizes 1992) write the following:

> *The principles of validation are never to take anything at face value-not to rely on one person's opinion or perception. Analysis is an aspect of validation, and both sides of an argument, or contrasting perceptions, should be included in the final analysis of report.*

I like both Maxwell's and Pratt & Loizes' views; however, I realise that there are many more ways of checking the internal consistency (with the use of triangulation). Some of which are: method triangulation, data triangulation, cross triangulation, time triangulation, space triangulation, combined triangulation, theoretical triangulation, theoretical triangulation, investor triangulation, etc.

Although there are a variety of triangulations, only the ones, which are applied in this research, will be explained here. These are:

a) ***Method triangulation***, which is the use of more than one-method. This approach helps to explore and achieve better results and enhance the validity of the research. Therefore, I adapted more than one method, i.e. the administration of the questionnaires to verify the findings of qualitative (interview) data, and vice versa. The similarities, differences and their implications will be discussed within the relevant sections of the study.

b) ***Data triangulation,*** approach enables collecting data from various sources and it enables a generalisation of the study. This study uses data from the questionnaires and semi-structured interviews with different groups of people and different settings.

c) ***Cross-site triangulation,*** accounts of the various events offered by pupils, teachers and parents in the different schools are compared although each site may be slightly different.

Method triangulation according to (Brannen 1992: 11) can be between-methods or within-methods. A within-method approach involves the same method being used on different occasions while between-method approach uses different methods in relation to the same object of study, substantive issue etc. (both types were used in this study). For example, questionnaires and interviews were used with the science teachers, parents and pupils in the study. A within-method approach may involve repeating the same method on a number of occasions and may produce different assessment of the situation at different times. Checking of data triangulation is very important since according to (Cohen & Manion 1989: 269) it is a technique of research to which many subscribe in principle, but which only a minority use it in practice. However, as I have explained above, I can say that I have both ascribed and used these data triangulations in my study.

### 4.5 Instruments of the study

The guidelines above helped the setting of the instruments for the study, which were designed over a period of one-year 1998/99 and were redrafted several times in co-operation with the academic adviser at Bristol University. The majority of the questions were based on information gathered from the literature review and my professional experiences. Most of the questions required short answers such as yes or no, however, there were a few open ended questions and some Likert type value based statements for the participants to state how much they agree or disagree with each statement.

All questionnaires and interviews were anonymous and written in English. Interviews were conducted in Tigrigna but were noted in English, questionnaires on the other hand were written in English and expected to be answered in English but if any one had difficulty expressing in English they could do so either in Tigrigna or in Arabic.

Moreover, there were several who chose to respond in Tigrigna or Amharic (an Ethiopian language used by most of the deportees from Ethiopia) and two pupils wrote part of their responses in Arabic. I had no problem translating and transcribing the Tigrigna and Amharic responses but I had two individuals translate the Arabic scripts for me, because I do not know the language.

Even though I knew that I would not have been able to use all the information, especially the data from the pupils, university students and the teachers, I have asked many questions to make sure that I obtained enough information. The number of questions asked to the different participants were; 12 for directors, 25 for parents, 30 for the teachers, 46 for the university students and 76 for secondary school pupils. The reasons why I decided to collect such a massive data are: a) the shortage of available written material related to the issue in question, b) the impossibility of travelling again to collect more data at a later stage and c) the need to check on the consistency and validity of the responses. Some of the questions especially those of the pupils' asked the same thing using different phrasing. For example, to check if boys and girls participated equally in the classroom they were asked; do more boys or girls respond to teachers' questions? and again they would be asked do more boys or girls ask questions in the class? Questions for the interviews were all semi-structured and open-ended they were presented in ways that the interviewee could lead the discussion once the key questions were asked. Interview questions being semi-structured, they varied with every person or groups however, the guiding number of questions were, 28 for the teachers, 22 for the pupils and 17 questions for the parents.

The questionnaires were yes/no types followed by open-ended and a few Likert type scale questions. The interview questions on the other hand, were presented in such a way as to give the respondents the chance to reflect more and express their opinions in a variety of ways. The questions were set in ways that they could stimulate all participants to give worthy responses, since some people are better in responding to multiple choice questions and others are better with explaining their views in writing.

### 4.6 Piloting

Piloting has several functions, principally to increase the reliability, validity and practicability of the questionnaires. Piloting gives an indication about questions, which don't work. When an instrument does not work, the cause may be that researchers have

used a different language from that of the subjects. If the researcher mis-phrases something to be too vague; the response options may not be appropriate; and/or the style of language may not match the style used by the respondents. Thus according to Barnes (1999):

> *A good pilot test will provide us with practical information about how long it typically takes to complete the questionnaires; which questions require most effect; and can usually tell us if people enjoy the experience of completing the questionnaire, .... Finally, the pilot test gives us data with which to test out the next stage of questionnaires-namely, what to do with the information once you've collected it.*

In accord with the guidelines above, the instruments were tested prior to administration to the candidates, i.e. they were piloted on a number of persons. Initially most questionnaire and interviews were piloted in October 1999, on Eritreans studying at the University of Bristol. Some changes were made and later on piloted again in Asmara in the first week of November 1999. The processes followed were:

> ***-Teachers' questionnaires**: Piloted on three science (biology, chemistry and physics) teachers in Barka Secondary School*
> ***-Parents' questionnaires**: piloted on three parents from Barka Secondary School*
> ***-Pupils' questionnaires**: Piloted on two $10^{th}$ grade and one $11^{th}$ grade pupils (Aspirants of the Comboni Missionary Sisters) and*
> ***-University Students' questionnaires**: piloted on three students, from the University of Asmara, the faculty of education, departments of biology, chemistry and physics.*

The aim for the piloting was to see how each item sounded and to assess the quality of the over all design of the questionnaire. The respondents were requested to fill in the questionnaires and add their comments about how they saw the questionnaire design in general and individual questions in particular. The pilot study also revealed the average completion time for the questionnaires.

In response to the feedback given by those who took part in the pilot tests, students' and teachers' questionnaires were reviewed and modified prior to administration. However, parents' and university students' questionnaires were left untouched, because the participants were happy with the ways they were originally set. At this point every care was taken to avoid distractions such as misspelling, and space for the responses to open-ended questions. Subsequently the pilot responses gave me the opportunity to carry out preliminary item analysis.

Piloting of the questionnaires enlightened the study in a number of ways. The results were used in conjunction with the design of the interview questions and helped to inform the main research study in a variety of ways as indicated below:

1. *They provided me with the opportunity to rephrase, focus and delete irrelevant questions.*
2. *They helped me find out the amount of time it would take to administer them and*
3. *They illuminated responses, which might be expected of respondents when questions are presented in certain ways.*

As a result, I became aware of the need to avoid unnecessary questions. This also allowed me to build up an initial profile of individuals and provided the opportunity for more meaningful subject-specific dialogue throughout the interview process.

### *5. Sampling Criteria and Procedures*

Sampling is an element that a researcher must consider when planning a fieldwork. A sample is a set of elements selected in some ways from a population. When the population is too large and would cost too much money to question every one, sampling is the simplest and most helpful representation. The aim of sampling is to save time and effort, but also to obtain consistent and unbiased estimates of the population status in terms of whatever is being researched.

There are thirty senior secondary schools and roughly 40,000 students in the country but the samples chosen to participate in this study were six schools and 295 pupils, their, directors, science teachers, parents. The reasons for selecting the six schools is because ethnically these schools were thought to be the most representative of the nation's secondary school population. Therefore, the population in this study is Eritrean:

1. 4 Secondary school directors
2. 35 secondary school science teachers
3. 295 $10^{th}$ and $11^{th}$ grade natural science pupils
4. 30 secondary school pupils' parents
5. 32 Natural science (education) university students

Participated in filling in the questionnaires

1. 22 secondary science teachers
2. 36 $10^{th}$ and $11^{th}$ grade natural science pupils
3. 11 secondary school pupils` parents

Participated in the interviews

There are two main methods of sampling which are probability and non-probability sampling; (Cohen et al. 2000: 99). A probability sample draws randomly from the wider population which may be useful if the researcher wishes to make generalisation which seeks representation of the wider population. Thus it is a form of sampling that is popular in randomised controlled trials.

Non-probability sample on the other hand, derives from the research targeting a particular group, in the full knowledge that it does not represent the wider population; it simply represents its self. This may be a small-scale research, for example, as with one or two schools as ethnographic or case study researches. The differences between probability and non probability samples is that in a probability sample, the chances of members of the wider population being selected for the sample are known, whereas in a non-probability sample the chances of members of the wider population being selected for the sample are unknown, (Ibid: 99).

In probability sample every member of the wider population has an equal chance of being included in the sample. However, in the non-probability sample some members of the wider population definitely will be excluded and others will definitely be included i.e., not every member of the wider population may have an equal chance of being included in the sample.

A probability sample seeks representation to make generalisation and draws its samples randomly from the wider population. Thus a probability sample has less risk of bias than a non-probability sample. Whereas, by contrast, a non-probability sample, being unrepresentative of the whole population, may demonstrate skewedness. A non-probability sample deliberately avoids representing the wider population; it seeks only to represent a particular group or a particular section of the wider population, e.g. a group of students who are taking a particular examination. For the reasons explained above, I personally prefer the probability sample because it is more inclusive and seeks representation of the wider population, thus I opted for a probability sample in selecting the subjects for this study. The method of my sampling criteria will be explained in the next subsection.

### 5.1 Probability and stratified samplings

There are several types of probability samples known as: simple random sample; systematic sample; stratified sample; cluster sample, stage sample; and multi-phase

sample. These samples all have a measure of randomness built into them and therefore have a degree of generalisability; therefore, I have used stratified random sampling in this study. The procedure of sampling was to draw six schools to participate in the study. The rationale for using this sampling technique is to allow me to implement the defined selection criteria for the sample, which will increase the possibilities of inclusion of all $10^{th}$ and $11^{th}$ grade pupils, directors, science teachers, secondary school pupils' parents and University students, in the study.

Stratified samples will be particularly important when endeavouring to secure comparative groups for life experiences that constitute variables in ex post facto designs (Black 1999: 121). And according to (Cohen et al. 2000: 101) a stratified sample is a useful blend of randomisation and categorisation, thereby enabling both a quantitative and qualitative piece of research to be undertaken.

A need to include pupils from the different ethnic background led me to first select pupils on the basis of ethnicity, group them by their gender and then randomly select pupils from each group. In this way, I was able to use stratified sample method in selecting the subjects for the study. Therefore the sampling was a two-stage process, i.e:

1. *to identify characteristics which appear in the sample, divide the wider population into homogeneous groups,*
2. *to randomly sample within these groups.*

Random samples were effected to establish, embody and investigate the subjects' perceptions on the issue in discussion. Care was taken to ensure that a balanced gender composition was established. The ethnic mix of individuals was resolved through the results of the stratified random sampling process, i.e. by the establishment of the random sample of the selected groups.

Stratified sampling method was used because it is appropriate for this particular study. Accordingly in agreement with the school directors, in schools 1 and 2, we identified homogenous classes, which could participate in this study. They were grouped as males and females first and the two groups were subdivided again between those who were to fill the questionnaires and those for interviews. The reason for this categorisation was to include all the ethnic groups and give equal chance of representation. This approach has both advantages and disadvantages. The advantage is that one can be sure that specific

groups are represented in proportion in the population and the disadvantage is that it is more complex than the simple random sampling and requires a greater effort in defining groups (strata) and identifying population components of each. Another possible disadvantage as (Sapsford & Jupp's 1996: 32) point out is that it might result in small strata of interest not being represented adequately. That is:

> *Although the purpose of stratification is to increase precision by reducing sampling error without increasing cost, it can, in some circumstances, lead to less precision than simple random sampling.*

I was aware that some researchers choose convenient samples from convenient contexts for research rather than the choice of representative groups. Convenient context means places: where the researcher lives or works, places which are easy to reach, or places which are chosen for a research but not chosen by the researcher. To avoid such shortcomings and to include as many pupils as possible from the diverse ethnic groups, I have selected six schools from four of the six administrative zones. (A map of the administrative zones is included in appendix 1). The four field-sites namely: Asmara, Barentu, Dekemhare, and Keren were selected because they represent diverse locations and diverse ethnic groups. Taken as a whole these schools represent a cross-section of the school types, i.e. state and private schools. The field work and data collection took place in November, December, January and February 1999/00.

Schools in Eritrea, whether state administered or private, are all composed of mixed gender, mixed ability, and mixed economical background. Because of the nature described above, it was not difficult selecting schools for a research; however, due to their geographical locations, it was not easy to include all nationalities in equal representation.

Although the study is not comparative about the different Eritrean ethnic groups, it is representative of most of the groups. Moreover, even though it is not an everyday reality of Eritrean student population, this study includes pupils living in 'Dekemhare boarding residences'. These boarding houses were: *Biet Timhirti Soura, Don Bosco and the Comboni Seminary*. Due to the availability of these boardings, pupils from all nine ethnic groups were represented in Dekemhare secondary schools. However, not all groups were represented in this study because some of them were not in $10^{th}$ or $11^{th}$ grades at the time of the study. In conclusion, Dekemhare as a site was chosen because

of its diverse representation of student population. The different Eritrean ethnic groups and their percentage are listed in the table below.

*Table 1*

*Eritrea's ethnic groups*

| *Ethnic group* | *Population* | *Region* |
|---|---|---|
| *Tigrigna* | *50%* | *Central highlands* |
| *Tigre* | *31%* | *Northern Eritrea* |
| *Saho* | *5.0%* | *Akeleghuzai/Semhar* |
| *Afar* | *5.0%* | *Dankalia Desert* |
| *Hidarib* | *2.5%* | *Barka/Sahel* |
| *Bilen* | *2.1%* | *Senhit* |
| *Kunama* | *2.0%* | *Gash-setit* |
| *Nara* | *1.5%* | *Gash-setit* |
| *Rashaida* | *0.5%* | *Sahel/Semhar* |

***Source: Children and Women in Eritrea 1994 UNICEF***

To have a balanced representation of ethnic groups, in Dekemhare where all ethnic groups are represented and Barentu home to the Kunama and Nara, the first chances were given to non-Tigrigna pupils and in both schools the participants' number was 70-75% other than Tigrignas, entailing that only 25-30% were Tigrignas. In Keren, home to mostly Tigre and Bilen, and Asmara, home to mostly Tigrigna, there was no mention of ethnicity; however, it is made sure that there was balanced representation of males and females as in all schools.

**5.2 Reasons why each group was selected**

Secondary school pupils, their parents, science teachers and the school directors were included in the study because they were thought to be partly responsible for the outcome of the different academic attainment between boys and girls. The university students, on the other hand, were included because they were thought to be good candidates for responding to some important questions pertaining to secondary science education and the ESECE exams. Their relatively short time away from the secondary schools would enable them to remember their schools' circumstances. Moreover, because of their age and experience their answers would be better reflected than the secondary school pupils. More importantly also they would give more objective and critical responses due to the fact that secondary school authorities cannot affect them even if they expressed views against them.

Parents who participated in the study were of two kinds, i.e. those whose education level was secondary school and above and those who did not complete secondary education. Those with secondary education and above were included because it was

thought that they would be able to compare and contrast experiences of secondary science education and give their valuable contribution to this research. The rest of the parents were included to help give an overview of the general Eritrean parents' population. Parents in this study were selected by the school personnel, and the reasons for their selection was either because of their level of education or somehow they were involved with the schools where this study took place.

In schools 1 and 2, the first site schools, more pupils demonstrated the desire to participate in the study and so more questionnaires were distributed. Contrary to the above, in school 4 some pupils who were scheduled to complete the questionnaires, failed to do so, and consequently the number of the participants in the different field sites has turned out to be as in tables 2-5. Furthermore, no interview took place in school 4 because the atmosphere was not very encouraging, since there was some resistance and poor co-operation. Several of the teachers requested to fill in the questionnaires were reluctant to do so and unlike in the other places where this study took place, I had to go back and forth many times before obtaining any completed questionnaire. In the end most of the questionnaires were completed, but some were returned un-answered. I respect the decision of those who chose not to participate in the study; however, I cannot conceal my disappointment at the degree of co-operation encountered both in the school and in some state offices in that zonal administration.

School 4 is located in a place where most recent and most relevant documents can be found, however, with the exception of few which were very helpful, several were found to have created bureaucratic obstacles to allow access to some useful information. Over all, it can be concluded that, of the four-administrative zones, where this study took place, that zone was found to be the lowest in degree of co-operation.

*In the following tables are the numbers of the participants who took part in responding to the questionnaires and interviews.*

***Table 2***

***Questionnaire returns (expected)***

| | ***Male*** | ***Female*** | ***Total*** |
|---|---|---|---|
| ***Directors*** | 6 | - | ***6*** |
| ***Pupils*** | 150 | 150 | ***300*** |
| ***Teachers*** | 25 | 5 | ***30*** |
| ***Parents*** | 20 | 10 | ***30*** |
| ***University students*** | 15 | 15 | ***30*** |
| ***Total*** | ***216*** | ***180*** | ***396*** |

*Table 3*

*Questionnaire returns (obtained)*

| | *Male* | *Female* | *Sex not identified* | *Total* |
|---|---|---|---|---|
| ***Directors*** | 4 | - | - | ***4*** |
| ***Pupils*** | 175 | 116 | 4 | ***295*** |
| ***Teachers*** | 32 | 3 | - | ***35*** |
| ***Parents*** | 23 | 7 | - | ***30*** |
| ***University students*** | 17 | 15 | - | ***32*** |
| ***Total*** | ***252*** | ***141*** | ***4*** | ***396*** |

*Table 4*

*Questionnaire returns (Obtained), by setting*

| | *Directors* | *teachers* | *Univ.Stu.* | *Pupils* | *Parents* | *Total* |
|---|---|---|---|---|---|---|
| ***School 1*** | *1* | *10* | - | *110* | *7* | *127* |
| ***School 2*** | *1* | *4* | - | *61* | - | *65* |
| ***School 3*** | *1* | *10* | - | *80* | *8* | *98* |
| ***School 4*** | *1* | *11* | *32* | *44* | *15* | *70* |
| ***Total*** | ***4*** | ***35*** | ***32*** | ***295*** | ***30*** | ***396*** |

*Table 5*

*Number of classes and grades which participated in the study (by settings)*

| *School* | *State* | | *Private* | | |
|---|---|---|---|---|---|
| | *Grade 10* | *Grade 11* | *Grade 10* | *Grade 11* | Total |
| ***Dekemhare*** | *2* | *2* | *1* | - | ***5*** |
| ***Barentu*** | *2* | *2* | - | - | ***4*** |
| ***Keren*** | *2* | *2* | *1* | *1* | ***6*** |
| ***Asmara*** | - | *2* | - | - | ***2*** |
| ***Total*** | ***6*** | ***8*** | ***2*** | ***1*** | *17* |

Thinking that some of my questionnaires would be lost, I always distributed more papers than the required number, which I think has helped to obtain the amount of responses that I did. I wanted to have equal representation of boys and girls from the secondary school pupils, but the findings turned out differently. The reasons for these are several, as I will explain here.

1. In one of the classes where we had assembled a set of boys and girls to fill in the questionnaires, some pupils, who were curious about what was going on, came in to the class and asked to use the left over questionnaire papers and so I allowed them, but I later realised that the number of boys was more than the girls.

2. In one of the schools where the director administered the questionnaires, he distributed the papers to all those who wanted to participate and in that school there were more boys than were girls. Hence the data collected from that school added to the already upset number of boys and girls.

3. There were more girls than boys who could not finish filling in the questionnaires in the space of time allocated and so they were permitted to take them home and return them after having completed them, but some never did.

When I realised all these, it was too late to do anything about it and so I left things to take their courses. I then rationalised by saying that it was probably providential that it happened like that, since the number of boys and girls in science classes is never 50% / 50% anyway.

***Table 6***

***Interviews participants, by settings***

| | ***Pupils*** | ***Teachers*** | ***Parents*** | ***Total*** |
|---|---|---|---|---|
| ***Dekemhare*** | 10 | 10 | 9 | 29 |
| ***Barentu*** | 10 | 4 | - | 14 |
| ***Keren*** | 16 | 8 | 2 | 26 |
| ***Total*** | ***36*** | ***22*** | ***11*** | ***69*** |

***Table 7***

***Interviews participants, by gender***

| | ***Male*** | ***Females*** | ***Total*** |
|---|---|---|---|
| ***Pupils*** | 20 | 16 | ***36*** |
| ***Parents*** | 5 | 6 | ***11*** |
| ***Teachers*** | 18 | 4 | ***22*** |
| ***Total*** | ***43*** | ***26*** | ***69*** |

## *6. Validity and Reliability*

The concepts of validity and reliability are multi-faceted. According to (Cohen et al. 2000: 105) there are many different types of validity and reliability. Hence there will be several ways in which they can be addressed. Accordingly Cohen et al.' theory suggests that it is imprudent to think that threats to validity and reliability can ever be erased completely; rather, the effects of these threats can be rectified by attention to validity and reliability throughout a piece of research.

On the line of validity and reliability (Bogdan & Biklen 1992) have this to say:

> *Qualitative researchers, whether in the tradition of sociology or anthropology, have wrestled over the years with charges that are too easy for the prejudices and attitudes of the researcher to bias the data. Particularly when the data must go through the researcher's mind before it is put on paper, the worry about subjectivity arises. Does perhaps the observer record only what he/she wants to see rather than what is actually there?*

Central issues concerning reliability and validity of questionnaires are that of sampling. An unrepresentative, skewed sample, one that is too small or too large, can easily distort the data, and indeed, in the case of very small samples, may prohibit statistical analysis. Aware of these factors, I was watchful of the possibilities leading to any errors and tried to avoid them in the research design and included a number of participants as indicated in the tables above.

### 6.1 Validity

The importance of validity in a research activity according to (Sapsford & Jupp 1996: 2) is stated as follows:

> *A part of the argument in a research paper entails showing that the subjects or cases investigated can be taken as typical or representative of the population under investigation; the technical term for this question is population validity. A second obviously important topic is validity of measurement. The question of whether the measures which are used really do deliver what the researcher claims for them, or whether they give vague and error-ridden results or even a competent measurement of something that turns out to be different from the researcher's claims.*

These are very important points to keep in consideration when planning a research; however, it is also true that they are very difficult to keep all properly checked. There are a variety of definitions as to what forms of proof engender validity. At the scientific method end of the definition, validity is confirmed through positivistic processes such as replication for the research methodology. The expectation is that anyone coming after and reading what the researcher did could repeat the research and achieve the same results. Or subsequent researchers could try other approaches to disprove the research. However, as (Sanger 1996: 40) points out:

> *People being people, are not very reliable as subjects of attempts to achieve validity. They change their stories. They lie. They refuse to talk. They forget. They move on and become impossible to trace. They can have a lot to lose. It is accepted that the researcher may show that in certain uniform conditions, chemical reactions will always produce the same results. But who can say that of people? Would a group of individuals react even twice in the same way to the same set of circumstances? It's absurd. There are no real action replays in life.*

I agree with Sanger's views because although researchers can try to give the best analysis and evaluation, I believe that it is difficult to conduct a research on people's values and attitudes yet come up with perfect results. Moreover, as (Cohen, et al. 2000) suggested reliability is a necessary but insufficient condition for validity in research and more recently validity has taken many forms.

However, in qualitative data validity might be addressed through honesty, depth, richness, and scope of the data achieved, the participants approached, the extent of triangulation and the disinterestedness or objectivity of the researcher. In quantitative data validity might be improved through careful sampling, appropriate choice of the instrumentation and appropriate treatments of the data. Based on all these and to avoid invalidity I have tried to include different subjects and multiple methods approach. Validity relies upon researches into the general rather than the particular. The higher the number of cases in the target population, the more such patterns will emerge and be found significant. Therefore, this study involves 465 subjects between the surveys and the interviews.

In qualitative data the subjectivity of respondents, their opinions, attitudes and perspectives together contribute to a degree of bias. Validity, then, should be seen as a matter of degree rather than as an absolute state. Therefore, at best a researcher strives to minimise invalidity and maximise validity. One way of validating interview measures is to compare the interview measure with another measure that has already been shown to be valid. This kind of comparison is known as 'convergent validity', (Cohen et al. 2000: 121). If the two measures agree, it can be assumed that the validity of the interview is comparable with the proven validity of the other measures. However, since there was no other research similar to this in Eritrea, I saw the need to create different instruments and include diverse respondents to participate in this study in order to be able to compare their outcomes.

### 6.2 Reliability

Reliability is essentially a synonym for consistency and replicability over time, over instruments and over groups of respondents. It is concerned with precision and accuracy. As in validity, there are two kinds of reliability. The first one, i.e. internal reliability, which shows that the research is consistent. That means the same instructions were given in the same way to every participant; that the information

collected was coded and analysed in the same way for all participants (which are the approaches followed in this study). Internal reliability requires careful thought and preparation. This means planning out, in detail, the order in which things occur and try to behave in the same way with all participants. I feel that I tried to control the internal reliability in this project because not only did I plan the activities with intent to follow the same approach in all sites but also tried to behave in same way in every school. External reliability on the other hand is that, if other researchers replicate the method in similar settings, they would expect similar results. In theory this may be possible; however, I am not too convinced that the outcomes will be as similar as the theorists' claim, because difference in the perceptions of the researcher may lead to different conclusions, thereby leading to different outcomes.

The issue of reliability does not reside solely in preparation for and conduct of the interview. According to (Kvale 1996: 163) it extends to the way in which interviews are analysed. For example, since replies are interpretations of social situations, a researcher may need to develop satisfactory methods of recording them. One way of doing this is to summarise interviews. However, this has a disadvantage of breaking the continuity and may result in interviewers' biases, in which the researcher may unconsciously emphasise responses that agree with his/her expectations and fail to note those that do not. In conclusion, these theories are good but difficult to implement.

### *7. Plans for the field work*

The schedule for the fieldwork was November-March 99/00.

November 1-10
- piloting of instruments
- printing of instruments
- Getting permission from the Ministry of Education

Nov. 11-30
- data collection in Dekemhare and transcribing of the interviews.

December 1-15
- data collection in Barentu and transcribe interviews.

January 8th – 21st 2000
- data collection in Keren.

February 2000
- data collection in Asmara

March 1- 15
- finish up with the remaining data collection and transcribing key data.

March 16-25th - vacation

March 27th return to England.

This was my schedule, but I came back to England having completed the data collection but not being able to do the transcribing, which took me longer than I thought.

### 7.1 How I felt in the process

Over all I was happy about how my plans were implemented. I found very co-operative directors, who gave me a warm welcome to their schools and tried to accommodate my schedule into their very heavy schedule. With their help, I was able to obtain almost all the data I hoped to attain and finish collecting it on schedule. However, there were some minor inconveniences, as I will explain here. I felt a bit uneasy in one of the schools because I sensed that I was not welcome, in fact, I was not able to obtain the complete statistical data in that particular school.

Furthermore, not all my plans went exactly as I would have liked them to. In one of the schools there was some confusion in the arrangement for the interview and the questionnaires administration. At first it seemed as though we have understood each other, but later on I noted that was not the case. Some pupils whom I thought were supposed to come for the interview in the afternoon were sent to me in the morning, when I was engaged administering the questionnaires. So I had to make another arrangement for the next week, because it was not possible to re-schedule it that week. This meant spending longer time in the field site than planned. In that same school, on the day $10^{th}$ and $11^{th}$ grade pupils were supposed to fill in the questionnaires, only the $11^{th}$ grade pupils came while the $10^{th}$ grade pupils were sent home by mistake, entailing that re-scheduling had to be done.

### 7.2 Concerns resolved

1) At the time there was tension in the air, i.e. there was fear that fighting with Ethiopia could break out any time in the southern part of the country. Therefore, I was apprehensive and started collecting the data quickly, beginning from the southern part; I was able to finish collecting it just on time.

2) Travelling to Barentu and finding accommodation would have been another concern for me but this too was solved, with the help of some old friends. The other three field sites were in major towns where travelling and accommodation was not a problem at all.

### *8. Data collection and analysis procedures*

As soon as I arrived in the different schools, I handed over the letter of introduction from the Minister of Education to the directors and made arrangements to start implementing my plans. I then gave the questionnaire papers to the directors, teachers, and parents all on the first day, but I did not start interviewing until the 2nd or 3rd day of my stay in the school. The method of my work is justified by the view, which says that data collection begins as soon as the researcher has identified a researchable problem, a setting for the study and he/she has set foot on the field site.

Moreover, once on the field site, I followed the primary rule of never letting the data accumulate without preliminary analysis. This is in line with the views of (Delamont 1992) who wrote:

> *Index your data as you go, do not allow the data to pile up without knowing what you have collected. Generate themes and categories as you go along, and review them frequently. It is better to have too many categories which you recombine later than to have too few.*

Furthermore, as the experiences of researchers indicate, a qualitative researcher begins data analysis immediately after finishing the first interview or observation and continues to analyse the data as long as he/she is working on the research, stopping briefly to write reports. On the same line as the above (Maxwell 1996: 78) has this to say:

> *During the reading or listening, you should write notes and memos on what you see or hear in your data, develop tentative ideas about categories and relationships. ... they facilitate such thinking, stimulating analytic insights.*

I realise that keeping a daily journal in which personal feelings and reflections are recorded can help me to become aware of my own values, for this reason both the University tutors and the research books recommend novice researchers to keep on writing down as much as possible. Their views are:

> *Because situation change makes attitude change, keep detailed information of situation changes explaining details of the results, which have come out as a consequence of the change. If you have data collected from two different situations keep them separated and explain each situation to show that the two situations have created the different results.*

Following the recommendations above, I tried to write as many memos as I possibly could to help me remember the causes and effects of the different incidents, however I did not need to use them as much while analysing the data or writing up of the dissertation.

While analysing the quantitative data I used the SPSS 6.0 for windows. SPSS Statistical Package (computer program designed to sort and manipulate quantitative data) was used for the questionnaires. This was followed by further analysis for the cross-tabulations by gender, parental education etc. The purpose of data analysis was to identify and describe the perceptions of the subjects regarding secondary school science achievement. All interviews, field notes, and surveys were transcribed, reorganised and restructured on return from the fieldwork and the procedure followed is presented here below.

### 8.1 How topics and sub-topics were selected

I assembled all the data following the sequencing answers, then started to look for the answers that were being repeated and for those which were different, so as to be able to reflect further upon them and give my own interpretation as to why participants came up with such responses. This procedure was used for all the responses obtained in the questionnaires and the interviews as will be explained further in the subsequent paragraph.

I first transcribed all the interview responses then assembled the responses to the questions following the sequencing numbers, next I tried to analyse the data putting special focus on the responses that were frequently mentioned and those that seemed rather unusual. Once I completed analysing all the data, since I could not use all of it, I selected what was relevant to the questions presented at the beginning of the chapter. Once I finished analysing, restructuring and categorising the data, I merged the findings from the interviews with the survey responses.

All interviews and surveys were treated in a separate sections for topical analysis. Files were organised by the school, thus allowing for analysis by the school and across schools. Survey data were also handled in a similar manner. SPSS allows for the development of codes of topics and their definitions. The codes served as cases for topics emerging from the data during analysis and helped to ensure consistency in applying codes across data sets. Because of the quantitative nature of the surveys, data was analysed with an eye toward counting the frequency with which topics were mentioned. Tables were then constructed to show those topics, which were most frequently mentioned. Analysis of interview data was both exploratory and ongoing, following general strategies.

Probably because of the type of questions I asked in the survey and the interviews, the answers I obtained were similar. Hence, merging the responses of the parents' and teachers' data was easy; however, it was slightly different in the case of the pupils because their responses were not always the same. Over all when the responses in the questionnaires and interviews were the same, to avoid repetitions of opinion I tried to comment less than when they were different.

Most of the interviewed teachers had filled in the questionnaires before the interviews, therefore they did not add new information to what they wrote in the questionnaires; however, they were able to develop their points further. Parents who participated in responding to the questionnaires and the interviews were not the same ones; however, since the questions were similar in content their responses were not very far apart from each other. The only difference between the parents' responses was that those who were interviewed did not have sufficient experience about secondary school sciences and so they could not share any thing in that regard.

In the process, themes or patterns that described regularities, shared beliefs, or norms of the participants toward achievement was inferred from the data. Interview information was compared and contrasted as a means of cross checking the reliability. This, in turn, was compared with the emergent themes across the schools and with results from the survey data. In collecting and analysing the data I tried to follow the guidelines presented by (Sherman and Rodman 1988: 135).

> *While coding and analysing the data, the researcher looks for patterns. He/she compares incident with incident, incident with category, and finally, category with category or construct with construct. By this method the analyst distinguishes similarities and differences among incidents. By comparing similar incidents, the basic properties of a category or construct are defined. Differences between incidents establish coding boundaries, and relationships among categories are gradually clarified.*

Moreover, I was sensitive to the issues of completeness identified and discussed by (Cohen & Manion 1989: 100) in the following manner:

- ***Completeness****- check that every question is responded*
- **Accuracy**- ask oneself, are all questions responded correctly? Was carelessness avoided?
- ***Uniformity****- all questions must be understood the same way. Make sure there is no variety in interpretation.*

As indicated above, all these points were carefully planned and implemented, however, people being people they have chosen to respond to the questions in the ways they perceived them. Hence, based on some of the results I found, I conclude that it is not possible to obtain perfect results even when all requirements are carefully implemented.

Planning a research is something, which seems to never end because once a researcher finishes one aspect of the project, he/she must think of another, to which he/she has not given enough attention. On this line (Cohen & Manion 2000 and Sapsford & Jupp 1996) suggest to keep checking for every thing in advance. Therefore,(Sapsford & Jupp 1996: 50) advise researchers to plan ahead on what to do with the missing data and non-responses.

> *Procedures for dealing with non-response and missing data have to be established when the research is being planned, and not left to desperate post hoc remedy. Establishing such procedures, total non-response should be distinguished from failure to respond to individual items in a questionnaire, and both should be distinguished from data, which are simply missing (i.e. lost or inadequately recorded).*

Because of what is pointed out above, I planned ahead the transactions on how to treat the missing data and when no responses occurred in the questionnaires.

### *9. Ethical issues*

Two issues dominate guidelines on ethics in research with human subjects. These are informed consent and the protection of the subjects from harm. These guidelines were implemented through the forms, which contained my description of the study and what will be done with the findings.

Informed consent is a key point in the research ethical issues. On this issue (Kvale 1996: 112) has the following argument.

> *Informed consent entails informing the research subjects about the overall purpose of the investigation and the main features of the design, as well as any possible risks and benefits from participation in the research project.*

Accordingly, the participants were free to participate or not in this study and I explained the purpose of the research on the cover letter of each set of the questionnaires (see samples of questionnaires in appendix, 2) and shared it orally with the interviewees. According to (Mertens and McLaughlin 1995: 83) researchers must follow appropriate ethical principles to ensure that the rights of human subjects are protected. Therefore,

the rights of the participants in this study were protected by not including their names in either the interviews or the surveys. Furthermore, to avoid raising incorrect expectations, I explained the reason behind the study and what I stood for. Moreover, although I found it difficult, I tried to make it clear that the research might not lead to action and stated that I was to learn from them rather than to solve their problems.

In (Kvale's view 1996: 114), although access must be restricted to protect the informant, there can be ways of disclosing the information without disclosing the identity of the subjects. Kvale argues:

> *Confidentiality in research implies that private data identifying the subjects will not be reported. If a study involves publishing information potentially recognisable to others, the subjects need to agree to the release of identifiable information. In such cases there should be privacy by changing their names and identify features in important issues in the reporting of interviews.*

This quotation seems to say that the principle of the informants right to privacy, is not without ethical dilemmas. Therefore, as indicated above, to minimise fears of risk of names being exposed, name of respondents were excluded from both questionnaires and the interviews. Moreover, they were assured that no one other than myself would know about their individual responses and great caution was taken when writing the analysis and the report.

## *10. Summary*

The key questions for this study are; why does achievement gap in Eritrean secondary school boys and girls increase as their ages and grades increase? Why is there achievement difference in secondary school boys and girls in science? Quantitative approach rests on measurement, therefore pre-structures data, the research questions and its conceptual frameworks. In this approach samples are typically larger than in qualitative studies and generalisation through sampling is usually important. Qualitative approach on the other hand, deals more with cases. Consequently, the proposed methods of inquiry employed in this research are qualitative and quantitative in nature. The reason for using a combination of the two methods is to ensure validity, enrich the data and check internal consistency (triangulation).

Method triangulation according to Brannen (1992) can be between-methods or within-methods. A within-method approach involves the same method being used on different occasions while between-methods approach uses different methods in relation to the same object of study, substantive issue. Application of triangulation had the sole purpose to overcome any possible data related weakness, enhancing the validity and richness of the data gathered. This approach helps to explore and achieve better results and enhance the validity of the research. Therefore, I adapted more than one method, i.e. the administration of the questionnaires to verify the findings of qualitative (interview) data, and vice versa.

There are two main methods of sampling; these are probability and non-probability sampling. A probability sample draws randomly from the wider population, which can be useful, if the researcher wishes to be able to make generalisation which seeks representation of the wider population. The difference between probability and non probability samples is that in a probability sample, the chances of members of the wider population being selected for the sample are known, whereas in a non-probability sample the chances of members of the wider population being selected for the sample are unknown.

A probability sample seeks representation to make generalisation and draws its samples randomly from the wider population. Thus a probability sample has less risk of bias than a non-probability sample. There are several types of probability samples known as: simple random sample; systematic samples; stratified samples; cluster samples, stage samples; and multi-phase samples. The procedure of sampling for this research was to draw six schools to participate in the study. The rationale for using this sampling technique is to allow the researcher to implement the defined selection criteria for the sample, which will increase the possibilities of inclusion of all directors, $10^{th}$ and $11^{th}$ grade pupils, secondary school science teachers, secondary school pupils' parents and University students, in the study. Stratified sampling method was used because it is more appropriate for this particular study.

In this study validity and reliability were particularly taken care of in the sampling of participants, in collecting the data and analysing it. Central issues concerning reliability and validity of questionnaires are those of sampling. (Cohen et al. 2000) suggested that reliability is a necessary but insufficient condition for validity in research and more

recently validity has taken many forms. However, in qualitative data validity might be addressed through honesty, depth, richness, and scope of the data achieved, the participants approached, the extent of triangulation and the disinterestedness or objectivity of the researcher etc. In quantitative data validity might be improved through careful sampling, appropriate choice of the instrumentation and appropriate treatments of the data. Validity relies upon researches into the general rather than the particular. The purpose of data analysis is to identify and describe the perceptions of the subjects regarding secondary school science achievement. Hence, files were organised by school, thus allowing for analysis by school and across schools. Survey data were also handled in a similar manner.

Concerning the ethical issues, it dominate guidelines on ethics in research with human subjects which insist on informed consent and protection from harm. Informed consent is a key point in the research ethical issues. Accordingly the rights of the participants of this study were protected by not including their names in either the questionnaire or in the interviews.

### *11. Concluding remarks*

This chapter was comprehensive in that it dealt with all the plans of activities required to conduct the research study. It showed why and how the research was conducted and the obstacles encountered. It discussed points such as the aims, the rationale for the study, the designing of the instruments for data collection, the manner in which fieldwork was conducted, the samples of the population who participated in the study and the procedure of analysis.

Having identified the nature of the research and the play of activities undertaken to conduct it, let us now move to the next level of operation-analysis of the data collection.

## *PART THREE*

## *CHAPTER FIVE*

## *1: ANALYSIS OF PUPILS PERCEPTION*

### 1.1 Introduction

The preceding chapter has explained the procedures of data collection from five categories of respondents, i.e. secondary school pupils, parents, directors, teachers and university students. Here, the focus is to discuss and analyse the data obtained from the secondary school pupils via questionnaires and interviews. In the interest of clarity, analysis of pupils' perception will be handled under four major headings: general information of pupil' home environment, school life, gender and learning and comparison between the results of questionnaires and interviews.

### 1.2 Relationship between quantitative and qualitative data and process of analysis

Methods for the data analysis for the study are explained in chapter four, however, as a reminder note, I will indicate how the data for this chapter was analysed and the findings integrated. I first analysed the quantitative and qualitative data separatedly and categorised the concepts by themes.

As indicated in chapter four, I could not use all the data collected for the study; therefore, I selected the points, which were in direct relationship to the questions in the study. In order to be able to do that, I first transcribed all the data, categorised it by themes and later selected the points, which related to the study's questions. In order to identify and group themes, I read the transcribed data obtained both from interviews and the questionnaires. Once I identified the theme and the points relevant to the study's questions, I tried to integrate them. Therefore, the finding in this chapter is obtained from a combination of both quantitative and qualitative data. However, since most of the data was obtained by way of questionnaire, the content in this chapter as well as in chapters six to eight will focus mainly on the quantitative data. But where questions in the questionnaires and the interviews were the same, they will be integrated.

1.3 The research questions

The topics for pupils' questionnaire include; general information, home environment, home activities, school life, science curriculum and gender and education. However, the questions the study try to answer are:

1. *Why does the achievement gap in Eritrean secondary school boys and girls increase as their ages and grades increase?*
2. *What factors produce the difference in boys' and girls' academic performance in Eritrean secondary schools, especially, in science?*
3. *To what extent are pupils' attitude and confidence in learning science subjects, and their consequent success affected by gender?*
4. *What part do teachers' attitudes play in the performance of girls in sciences?*
5. *Is there a relationship between parental educational level and the child's achievement?*
6. *Do parents generally expect less of their daughters than of their sons in science education?*
7. *Does Eritrean society encourage boys and girls to achieve in secondary education, especially in the area of science?*

### *2. General information/Pupils' home environment*

This section contains five sub sections namely: attitude towards higher education, family members' educational level, parental involvement, parental occupation, and home activities. In the hope of finding answers to some questions of the study, pupils were asked several questions, hence this section tries to answer to some them.

In an attempt to respond to the questions of the study, various types of questions were designed to test some assertion of the Eritrean society, which constitute that boys and girls have different attitudes and values and that girls lacked ambition. If the theory of social reproduction is correct, one expects girls' attitude to their, 1) future educational level, 2) their future spouses' education and 3) gender division in career aspiration, to be largely accepting unquestioningly any thing that comes their way. To find out whether different patterns or aspirations emerged for boys and girls, about the jobs they were hoping to hold when they left secondary schools they were given some questions with a list of items to choose from. The question and the answers are in the table below.

## 2.1 Attitude towards higher education

### *2.1.1 Future educational level*

*Table 1*

***What would you like to do when you complete secondary education?***

| *When I complete secondary education I would like to:* | ***Male*** | | ***Female*** | |
|---|---|---|---|---|
| *1. Get to the university and then become ....* | *136* | *86.6 %* | *82* | *78.1 %* |
| *2. Go to a Nursing School and then become a nurse* | *9* | *5.7 %* | *9* | *8.6 %* |
| *3. Go to a Teacher Training Institute and be an elementary school teacher* | *11* | *7.0 %* | *11* | *10.5 %* |
| *4. Get a job* | *1* | *0.6 %* | *3* | *2.9 %* |
| *5. Stay at home and hold traditional role* | *0* | *0 %* | *0* | *0 %* |

***NB. The students who participated in filling the questionnaires were 175 males, 116 females and 4 who did not identify their sex. Therefore, the first numbers both in this table and in the ones to follow will indicate the number of the students who responded to the questions.***

As can be noted from the participants' responses, an overwhelming majority, i.e., 86.6% males and 78.1% females, have said they desire for a university education. When they were asked to state the areas of professions they aspired to join, they identified jobs such as: pilots, electrical engineers, mechanical engineers, civil engineers, medical doctors, surgeons, dentists, nurses, scientists, chemistry professors, biochemists, micro-organism specialists, economists, technicians, bank managers, geographers, and journalists. But the question remains; how many of them will be able to attain their hearts' desire since not many are able to pass the ESECE successfully, which are the determinant factors for joining any of the professions they have enlisted.

Observing pupils' responses, it is possible to conclude that although there was a slight difference in the number of boys and girls in the choice of the different professions, girls showed as much ambition as their male counterparts, in their job selection. From these responses it should become clear that a simple explanation for girls' lack of ambition is far from justified. With the exception of the 2.9% who expressed the wish to get jobs to earn a living immediately after the completion of their secondary education, girls were not ready to interrupt their formal education. Their responses also demonstrated that they were not too keen to leave school earlier than the boys, neither were they ready to hold jobs, which were traditionally feminine. The traditional jobs for women are to stay home and care for the family, but there was no such choice in their responses. Even those who would like to start jobs immediately after completing secondary education meant that they were not ready to stay home to do the usual female jobs.

Participants in this study were representatives of the rural and urban areas; however, from their responses it was not possible to observe any difference between their careers and/or their educational aspirations based on their home environment. This is probably due to the fact that Eritrean secondary schools are located in towns and country children who want to continue in their education either commute to these schools walking long distances or rent rooms in the towns where their schools are located. As the latter seems to be the practice in the majority of cases, it is not impossible to maintain the notion that secondary school pupils from rural background tend to share similar aspirations with their town peers.

### *2.1.2 Future spouses' educational level*

Factors related to cultural norms, traditional beliefs and practices can have strong influence on girls. To test whether there was notable attitude difference between boys' and girls' responses, concerning the educational level of their future spouses and to check if what they wished for themselves would be the same for their future spouses, pupils were asked the question presented in the table to follow.

***Table 2***

***What level of education would you like to have for your future spouse?***

| ***Future spouses' educational level*** | ***Male*** | | ***Female*** | |
|---|---|---|---|---|
| *1. University level* | 82 | 54.7% | 50 | 78.1% |
| *2. Teacher Training Institute (TTI)* | 14 | 9.3% | 2 | 3.1% |
| *3. Secondary school level* | 25 | 16.7% | 4 | 6.3% |
| *4. Elementary education level* | 10 | 6.7% | 2 | 3.1% |
| *5. I don't mind* | 19 | 12.7% | 6 | 9.4% |

Overall the table indicates that the majority of the pupils (both males and females) would prefer highly educated spouses, i.e. secondary education and above. However, it is clear from the high percentage of the respondents that more girls than boys demonstrated the preference for highly educated spouses, particularly university graduates. Moreover, it was surprising to note that as high as 86.6% (see table 1), of the boys expressed the desire for university education for themselves as opposed to only 54.7% for their future spouses. Girls on the other hand, have wished the same thing both for themselves and for their future spouses, i.e. in both cases 78.1% chose university education. This significant difference between boys and girls' responses, to a large extent, shows the influence from the society's attitude, which favours boys' education.

Eritrean society expects a man to be superior to a woman; therefore, it is possible that a man would seek a wife who is less educated than himself. Boys' wishes reflected Eritrean society's attitude in which men either don't worry about their wife's education or prefer to have spouses who are less educated than themselves so they can have a better control, over the family affairs.

## 2.2 Family members' educational level

To attain a general overview of the pupils' background and to see how their home environment would affect their learning, participants in this study were asked several questions in that regard. To get an indication about the educational level of their parents, participants were presented with a question and several possible answers from which to choose the most appropriate ones. The questions and their responses are presented in the tables below.

***Table 3a & b***

What is your **paternal** educational level?

| *Level of education* | ***Male*** | | ***Female*** | |
|---|---|---|---|---|
| *1. None at all* | 66 | 37.9% | 36 | 31.6% |
| *2. Elementary* | 45 | 25.9% | 22 | 19.3% |
| *3. Junior* | 17 | 9.8% | 15 | 13.2% |
| *4. Secondary* | 29 | 16.7% | 26 | 22.8% |
| *5. University* | 17 | 9.8% | 15 | 13.2% |

What is your **maternal** educational level?

| *Level of education* | ***Male*** | | ***Female*** | |
|---|---|---|---|---|
| *1. None at all* | 96 | 56% | 49 | 42.6% |
| *2. Elementary* | 41 | 24% | 40 | 34.8% |
| *3. Junior* | 13 | 7.6% | 11 | 9.6% |
| *4. Secondary* | 18 | 10.5% | 11 | 9.6% |
| *5. University* | 3 | 1.8% | 4 | 3.5% |

The table indicates that the majority of parents, especially mothers, have little formal education, in particular secondary education and above. The findings in this study are not far from what is expected because a large percent of the parents have low

education but in spite of that males have better chances of attaining education than females. Moreover, in Eritrea it would appear that whatever the educational level of their parents might have been, males are made to go to school and are encouraged to stay in as long as they possibly can. As a consequence there are more males in secondary schools as well as at the university level.

If parents are better educated they usually give more chances of higher education to their daughters than when they are with lower education themselves. Furthermore, high status parents probably gave greater support to their daughters' schooling while parents who are less educated (possibly also more poorly educated), generally hold a more traditional attitude, despite the government attempts to encourage female education. Parental background factors may be important in several ways. If parents are unable to buy basic learning tools such as text-books, the student may be severely handicapped, particularly if the school library is non existent. On the other hand, educated parents may provide extra support for their children, such as by special coaching.

Children's early years experiences are crucial in forming their perceptions of what constitutes "girls" and "boys" domains. Hence students learn better if they feel empowered and valued. However, teachers' or societies' low expectations of them might impede this, predicting and encouraging their failure. Furthermore, as indicated in the literature review 'the outside of school (socialisation) factors', the parents and peers influence the way children feel and behave, the parental expectation about their children's academic achievement may also vary depending upon the cultural values where they find themselves. Hence, expectations that both parents and teachers have about certain subjects, e.g. science performance by boys and girls may affect their attitude.

To find out about their family members educational level and the assistance they may have received, pupils were asked: a) if any member of their family was a university graduate and b) if they received academic assistance at home. The questions and the number of replies are in the table below.

***Table 4***

| | ***Has any member of your family been a university student?*** | | ***Do you receive academic help at home with the difficult subjects?*** | |
|---|---|---|---|---|
| | ***Male*** | ***Female*** | ***Male*** | ***Female*** |
| ***Yes*** | 35<br>20.1% | 47<br>40.5% | 38<br>38.4% | 40<br>50% |
| ***No*** | 139<br>79.9% | 69<br>59.5% | 61<br>61.6% | 40<br>50% |

At this junction, girls seem to be slightly at a better position than the boys, but the question still remains that, if as many girls as opposed to boys, had family members

with higher education and were receiving the help they needed, why is there a gap in the achievement between the two groups? Given the contrast between the supposed help girls have received and the yearly exam results, I started to reflect further and several questions came to mind. Some of which are: Do girls' mean what they say, when they give their responses? Can girls' responses be interpreted the same way, as those of their counter parts, the boys'? Could it be the lack of 'quality' rather than the lack of 'quantity' help these girls may be suffering from? As will be pointed out later in the chapter, it is noted that girls more than boys have tried to give positive responses even when apparently things looked rather negative. Hence I suspect that they may have tried to make the situation look better than it actually was, especially in regards to the help received at home.

## 2.3 Parental involvement

To find out how much parental involvement (encouragement) in the education of their children took place participants in this study were presented with (Likert type) statements and were asked to show their degree of agreement or disagreement. The statements and replies follow:

***Table 5***

***By ticking (✓) under the appropriate boxes, please indicate how much you agree or disagree with each statement.***

| *Statement* | *Strongly agree* | | *Agree* | | *Disagree* | | *Strongly disagree* | |
|---|---|---|---|---|---|---|---|---|
| | *M* | *F* | *M* | *F* | *M* | *F* | *M* | *F* |
| *1. If I had problems in school my parents will always be ready to help me* | *105 60.3%* | *46 40.4%* | *50 28.7%* | *50 43.9%* | *12 6.9%* | *10 8.8%* | *7 4.0%* | *8 7.0%* |
| *2. My parents expect too much from me (at school)* | *101 59.1%* | *46 41.8%* | *46 26.9%* | *40 36.4%* | *15 8.8%* | *17 15.8%* | *9 5.3%* | *7 6.4%* |
| *3. My parents treat me very strictly at home* | *35 20.5%* | *20 19.0%* | *61 35.7%* | *38 36.2%* | *47 27.5%* | *24 22.9%* | *28 16.4%* | *23 21.9%* |
| *4. My parents don't care about my achievement* | *10 5.8%* | *7 6.7%* | *16 9.2%* | *9 8.6%* | *39 22.5%* | *32 30.5%* | *108 62.4%* | *57 53.3%* |
| *5. My parents encourage me to do well in school* | *111 64.9%* | *48 45.7%* | *44 25.7%* | *39 37.1%* | *7 4.1%* | *8 7.6%* | *9 5.3%* | *10 9.5%* |

The statements varied from help received at home in academic matters to parents not caring about their children's achievement. Despite the diversity of the concepts, the majority of the pupils chose positive components to describe their parental support and encouragement. However, it is important to note that responses to statements 1, 2 and 5,

which were in direct relationship to school life, about 60% male as opposed to only about 40% female candidates said they strongly agree. As expected only a smaller number from both groups (5.6% male and 6.7% female candidates) strongly agreed with the rather negative and leading statement, number 4. When the subsequent responses to that statement were categorised by the sex of the pupils, it was possible to observe the number of girls who said strongly-agree to be larger than that of boys. This indicates that parents need to show interest in the education of their children irrespective of their sex and need to encourage them to achieve good results.

In general it can be stated that, although both boys and girls were encouraged by parents to attend secondary schools and attain good results, there was some indication of different treatment from their parents. In all statements regarding school, boys and girls demonstrated views, which reflected the degree of encouragement they received in order to achieve good marks in school. Hence, boys systematically appeared better motivated and supported to achieve by their parents than the girls were. The responses in this section shed light on the key question of this study, which is about the level of parental encouragement to achieve good educational results. Besides as indicated in the out-of-school socialisation factors (Murphy: 1997), the effect of parental and teacher support on motivation is stronger for females than for males, but females were less encouraged in this study.

Over all, looking back at the table above, it is interesting to note that most pupils (both boys and girls) tried to be as positive as they possibly could, regarding their parental support. Pupils cannot be blamed for being so positive about their parental support and encouragement. However, after seriously reflecting upon the issue and some of their responses, I came to suspect that some of the participants may have been trying to impress me rather than attempting to reflect the reality. The reason for my views is that some of their responses in the questionnaires were different from those of the interview responses. In the interview some pupils, especially some girls, indicated that their parents did not give them as equal treatment as their brothers, but in the questionnaires, they gave rather positive responses. Therefore, I started to worry about the reliability of some of the pupils' responses.

Experience among Eritrean children suggests that parents do not give the same level of encouragement to their sons and daughters to achieve in education. This widely

perception and practice seems to be reinforced by the findings of a recent study on schooling and gender inequality in other African countries with similar situations, e.g. Guinea and Ethiopia (Colclough et al. 2000). Such studies presented a variety of cultural practices, which impeded the attendance and performance of girls at schools relative to boys and measured gender inequality in-schooling and out-of-schooling in both quantitative and qualitative terms. Some of the findings of the study, which are relevant to the situation in Eritrea, include a girl's allegiance after marriage to her husband's family. Because of the perceived benefits, parents are likely to favour the education of sons over daughters. Furthermore, it was indicated that parents and teachers commonly expect boys to perform better in maths than girls and girls internalise the factors, there by resulting in questioning whether they have the ability to pursue the study of such difficult subjects. Similar findings to this are also reported about some African studies in (Swainson 1995), in which he denotes that parents favour the education of their sons over their daughters. Presumably this leads to girls losing interest in maths and science as they leave middle school and to redirect their interest to social science content areas, where they are presumed to be more successful.

## 2.4 Parental Occupation

A number of factors were found to have significant effects on school attainment in addition to the sex of the child. A primary factor often associated with school success is the occupation of the mother and father. To find out about the majority of pupils' **paternal** occupation, candidates were asked to state what kind of jobs their fathers did and their responses were as follows:

52 farmers, 30 merchants, 22 government officers,
14 deceased, 13 drivers, 12 job-less (deportees from Ethiopia).

The rest held jobs varying from highly professional to the daily manual workers. These include: medical doctors, nurses, lawyers, judges, policemen, soldiers, teachers, shop-keepers, goldsmiths, electricians, plumbers, construction workers, carpenters, factory workers, watchmen. From their responses it is possible to understand that a big proportion of the participants had fathers who were farmers, suggesting that, these children of the farmers were living away from their families and villages in order to be nearer to the secondary schools, all of which are located in towns.

About 80% of the Eritrean population are either farmers or semi-nomads, entailing that they had very little formal education for themselves, but allowed it for their children.

However, although it is great to observe that many of these children were given the chances to attend secondary schools, it is possible to conclude that probably none of them will reach university level, as are their expressed wishes. Some of the rural dwellers, who live with the parents may not receive any academic help because their parents' educational background does not permit it. Those who stayed away from their parents and rented rooms in towns, may fail to use their study time wisely because they do not have parental or adults' supervision while studying. Moreover, the children who lived with their parents and commute to the schools usually walk long distances, making it very difficult for them to get enough time and energy to study. Besides, when these are in the villages, they probably spend a lot of time helping their parents, and to make matters worse, they do not have access to the libraries because they live too far away from the nearest libraries. This brings us to the inference that if any of the rural area pupils are going to succeed in secondary education and enter the university, they need to work extra hard to obtain equal results to some of their urban peers. It is no wonder, therefore, that even though both rural and urban pupils attend the same secondary schools, an overwhelming majority of students who enrol at the University of Asmara (where I work) are children of highly educated parents, who are predominantly town dwellers. This observation seems to be reinforced by the findings from the Caribbean states (Kutnick 2000) and by the African studies presented in (Swainson 1995). Both these studies point out that children whose parents worked in different occupations, such as educated/managerial occupations, scored consistently higher marks in most subjects, than children from other parental occupational groups.

The discussion up to this point has focused mainly about the pupils' ***paternal*** occupation but now it will shift to the ***maternal*** jobs. It is thought that employed mothers may influence their children's education positively or negatively depending on the circumstances they were in. Employed mothers in Eritrea could be of two types. The first group may be those who are highly educated and holding jobs commensurate to their qualification. The second group could be (mostly) single parents and head of the families, who feel obliged to do any paid jobs to make both ends meet, but it is not possible to know the type of jobs these mothers held because pupils were not asked to identify them.

However, to find out how many mothers were employed outside of their homes, pupils were asked if their mothers had salaried jobs. To this question 23.1% of the participants

replied "yes" and 68.8% replied "no", but the remaining 8.1% declined to respond. When responses of those who said their mothers worked outside of the homes were classified by the gender of the respondents, it was found that more mothers of girls (27.6%) as opposed to (24.1%) mothers of boys were employed.

The reason why I think that working mothers influence their children's education positively or negatively is that, if they are highly educated, they will encourage their offspring, by being the mentors, by giving some academic support and/or by paying some one to help them to attain the desired outcome. An un-educated working mother, on the other hand, because of her educational level, may not be able to help her children academically. Furthermore, she may work in a low-paid job, which takes a lot of her time and energy, preventing her from being available for her children's needs. Therefore, the children will spend a lot of their time doing the house chores instead of concentrating on their schoolwork.

Eritrean mothers whether employed outside the home or not, have full-time jobs caring for the family; therefore, girls observe their mothers' daily responsibilities and understand what awaits them in their future lives as wives and mothers. Girls were expected to perform household chores, and to look after younger siblings, the demand on their time may be greater than upon the boys, and their school attendance may be more affected. Furthermore, it is pointed out that female domestic labour is a key factor that militates against girls' achievement at school, and that more parents attach a much higher value to female labour than that of boys. Moreover, girls are not "daft". They see the alternatives to academic achievement, because they know that whether they achieve in school or not, their main jobs will be full-time caring for their families above and beyond any career. So if the majority of them are not achieving academically, unlike their counterparts, the boys, they may feel assured that they will not remain jobless after all.

**2.5 Home activities**

Most if not all Eritrean secondary school aged children, especially those from the rural area, help their families at home. Girls would help in the house, hold activities such as taking care of their siblings, preparing and cooking food, cleaning the house, fetching water and collecting and fetching firewood; and boys would be involved in working on the family farm, ploughing and harvesting crops and looking after livestock. Boys, who

are town dwellers on the other hand, may help in metal workshops, wood workshops or in garages. Hence to find out the number of those who helped their families on a regular basis, pupils were asked the questions presented below.

*Table 6*

| | *Do you help the family on the regular base?* | | *Do you help 3 hrs or more per week?* | | *Do you find enough time to study and help your family?* | |
|---|---|---|---|---|---|---|
| | *Male* | *Female* | *Male* | *Female* | *Male* | *Female* |
| *Yes* | 134<br>76.6% | 102<br>88.7% | 29<br>22.3% | 43<br>42.6% | 124<br>72.1% | 78<br>67.8% |
| *No* | 41<br>23.4% | 13<br>11.3% | | | 48<br>27.9% | 37<br>32.2% |

As expected, although a large number of the pupils helped at home, the number of girls who helped on a regular bases three hours or more per week is almost double to that of boys. However, it is possible to note also that lack of enough time to study does not seem to be a major problem for most of the pupils' academic weakness, although, it is evident that it may have been for some of them.

### *3. Pupils' perception about their school life*

This part contains several sub sections, which are students' perception about: their schools, the core subjects, science teachers and science subjects.

To obtain the participants' views concerning the dynamism of their schools, a combination of both positive and negative (Likert scale type) statements were presented in which they were asked to indicate the degree of their agreement or disagreement. The responses to the statements are in the tables below.

*Table 7*

***By ticking ( ✓) in the appropriate boxes, show how much you agree or disagree with each statement.***

| *My school:* | *Strongly agree* | | *Agree* | | *Disagree* | | *Strongly disagree* | |
|---|---|---|---|---|---|---|---|---|
| | *male* | *female* | *male* | *female* | *male* | *female* | *male* | *female* |
| 1. Is nice and beautiful | 67<br>38.5% | 36<br>32.4% | 72<br>41.4% | 59<br>53.2% | 28<br>16.1% | 12<br>10.8% | 7<br>4.0% | 4<br>3.6% |
| 2. Has effective rules and regulations | 78<br>44.5% | 49<br>42.2% | 76<br>43.4% | 50<br>43.1% | 15<br>8.6% | 7<br>6.0% | 1<br>0.6% | 3<br>2.6% |
| 3. Does not have good learning facilities | 35<br>20.0% | 21<br>18.1% | 45<br>25.7% | 28<br>24.1% | 53<br>30.3% | 44<br>37.9% | 39<br>22.3% | 15<br>12.9% |
| 4. Is a good place to study in | 60<br>34.3% | 42<br>36.2% | 60<br>34.3% | 45<br>38.8% | 40<br>22.9% | 17<br>14.7% | 13<br>7.4% | 6<br>5.2% |
| 5. Is always noisy, I can't concentrate in class | 27<br>15.4% | 9<br>7.8% | 37<br>21.1% | 28<br>24.1% | 56<br>32.0% | 39<br>33.6% | 53<br>30.3% | 30<br>25.9% |
| 6. Does not provide us with good learning atmosphere | 20<br>11.4% | 11<br>9.5% | 32<br>18.3% | 24<br>20.7% | 60<br>34.3% | 42<br>36.2% | 54<br>30.9% | 29<br>25.0% |
| 7. Add your own view | | | | | | | | |

***NB: the missing numbers are of those who declined to respond to the question***

It was a nice surprise to find that the majority of the candidates were very positive about their schools and over all they were happy about how their schools were run. Their views in regard to question three (learning facilities) were almost equally divided between those who agreed and those who disagreed. For the rest of the questions however, they could not have been any more positive than they were in these responses. Incidentally, this raises a number of interesting questions, which will be touched in the subsequent sections.

The reason why I think that pupils were unrealistically positive is because those who were interviewed were not as positive as those who participated in filling the questionnaires. In the interviews there were several pupils who indicated that their schools were organised differently and they wished that their views were considered and implemented but there was no such view expressed in the questionnaire responses.

### 3.1 Pupils' additional views

Pupils were invited to add their own views concerning their schools. Those who thought their schools needed improvement, especially pupils in schools 1, 2 and 3 where the majority of the participants in the study were from, strongly emphasised the need for renovation of their school buildings and provision of updated learning material. Overall these highlighted six areas for improvement namely: textbooks, libraries, science laboratories, school toilets, and Indian teachers.

- *There is an extreme shortage of learning material, especially textbooks. Moreover, there is shortage of books in the libraries; the library hours are too restricted; more importantly pupils were unhappy because they could not borrow books to take home. In some schools (for example in school 2) pupils said that both the library and the classrooms were disturbed by the noise and the terrific dust created by the bypassing cars.*

- *Science labs are almost non-existent because the supplies (chemicals and equipment) are too little and dated. Likewise, classes can't fit inside the labs to do experiments; therefore, they are not used as much as they should be.*

- *Participants remarked that they lacked sufficient and proper playgrounds. Moreover the school buildings are too old and too small to accommodate all their current needs.*

- *In addition in school 2, where the temperature stays high almost throughout the year, pupils expressed the desire to have drinking water and the need of planting trees to create some shade and to embellish the view.*

- *Some of the participants demonstrated unhappiness about the condition of their school-toilets, due to the shortage of water. Others pointed at the need for more offices, better labs, and more classes for some technical and commercial departments.*

In the light of what I saw when visiting the target schools, pupils' complaints are justified because most of them are learning in environments, which are extremely restrained and not very conducive for learning. However, it is important to note also that Eritrea is one of the poorest nations, which has come out from very long years of war, which have left her devastated. Besides, as the nation was trying to reconstruct its devastated infrastructures, sadly in 1998, it was again forced to enter into another war with Ethiopia, which started as a border dispute, but escalated into a fully dilated war, which destroyed the little which had been reconstructed. In fact school 2, where this study took place, is now reported to have been destroyed, like many other schools in its vicinity by the invading Ethiopian army.

Up to this point the discussion focused around the technical and structural items and the need for improvement, but now we move on to the pupils' views about some of their expatriate teachers, specifically the Indians. There are a substantial number of Indian teachers in most Eritrean secondary schools and several pupils complained about them because they said they could not learn much from their teaching. Almost all of the interviewed pupils mentioned the 'Indian teachers' and when they were asked to explain their views in this regard, they used quite strong words to describe the Indian teachers' attitude towards them and the Eritrean schools in general. This led me to sense some cultural misunderstanding caused by some degree of antipathy between Eritrean pupils and the Indians.

Motivated by the rather strong reaction of the pupils, although it was not part of my programme, I decided to interview 6 Indian teachers from two schools to get a balanced opinion on the issue. The resultant outcome of the interaction was that two of the interviewees said they were happy to offer their services to their host schools, but the rest sounded rather unhappy. Yet probably because the Ministry of Education does not have other alternatives, it continues to recruit more Indian teachers even at this point, despite the strong reaction of the pupils.

### 3.2 Core subjects

To determine whether the disliking of the subjects played an important role in pupils' lack of achievement, participants were asked if they enjoyed their schoolwork for which 95.5% responded positively. Those who said they enjoyed their schoolwork were asked to indicate their favourite subjects choosing from a list. These included subjects such as Mathematics, Science, English and Arabic and their replies are listed in the table below.

*Table 8*

| *Mathematics* | | *Science* | | *English* | | **Arabic** | |
|---|---|---|---|---|---|---|---|
| *M* | *F* | *M* | *F* | *M* | *F* | *M* | *F* |
| *66*<br>*39.8 %* | *38*<br>*36.2 %* | *61*<br>*36.7 %* | *37*<br>*35.2 %* | *27*<br>*16.3 %* | *15*<br>*14.3 %* | *4*<br>*2.4 %* | *2*<br>*1.9 %* |

It is very interesting to observe that almost 100% of the participants enjoyed their school works, yet it was interesting to notice also that both boys and girls expressed very similar views. Yet, although both males and females seem to prefer Math and Science to English and Arabic, the figures indicate that boys slightly but consistently showed more favourable attitude towards the subjects than did the girls, which might partly explain why they achieved better grades than girls. For as long as pupils like the subjects, they will spend more time studying them. Moreover, it is observed that even if girls liked the subjects as much as their brothers, they are not given the same opportunities to study at home, nor are they given the same encouragement to achieve by their teachers in science classes. Hence the reasons for the achievement disparity between boys and girls is assumed to be multiple. These may include that more boys than girls: a) have demonstrated interest towards the subjects, b) are given the time to concentrate in their study c) are encouraged to achieve in their education and so they were studying harder than girls were and as a consequence obtained better grades.

### 3.4 Science teachers

As indicated in the literature review concerning 'the in school factors', what determines whether or not males and females engage in the same way with science are complex, because of the joint influences of the teachers, the students and the culture in which the curriculum is embedded. The interactive effects of teachers and pupils variables endeavour to change the patterns of engagement should be directed to both teachers and pupils. Based on these findings and on the belief that subject liking and teacher liking are in direct relationship, i.e. if one likes the subject he/she also likes the one who

teaches it, or vice-versa. Therefore, participants in this study were asked to share their views and to list their science teachers in degree of preference.

***Table 9***

***Which subject teacher is your most favourite one?***

| *Biology* | | *Chemistry* | | *Physics* | |
|---|---|---|---|---|---|
| *Male* | *Female* | *Male* | *Female* | *Male* | *Female* |
| *69*<br>*40.0%* | *50*<br>*43.9%* | *65*<br>*38.2%* | *33*<br>*28.9%* | *18*<br>*10.6%* | *12*<br>*10.5%* |

From these figures, it is possible to observe negative correlation between the degree of subject difficulty and the pupils' association to their favourite teachers. The more the subjects were believed to be difficult, the less the pupils associated them with their favourite teachers, on the contrary, the less the subjects were thought to be difficult the more they were associated with favourite teachers. Biology is believed to be the easiest subject to learn, followed by chemistry and then by physics and as a consequence the order of favourite teachers appeared to be 1st) biology 2nd) chemistry and 3rd) physics. From the tables above one can gain an understanding that subject difficulty or otherwise may be the factor for liking or disliking one's teachers.

To obtain a better understanding of the perception of pupils concerning their teachers, participants were presented with Lickert type statements for which they were to indicate their degree of agreement or disagreement. The statements and their replies are in the tables below.

***Table 10***

***By ticking (✓) under the appropriate box show how much you agree or disagree with each statement***

| *My teachers:* | *Strongly Agree* | | *Agree* | | *Disagree* | | *Strongly Disagree* | |
|---|---|---|---|---|---|---|---|---|
| | **M** | **F** | **M** | **F** | **M** | **F** | **M** | **F** |
| *1. are strict with me* | 22<br>13.7% | 8<br>7.9% | 62<br>38.5% | 42<br>41.6% | 56<br>34.8% | 33<br>32.7% | 21<br>13.0% | 18<br>17.8% |
| *2. encourage me to give my views in class* | *50*<br>*29.2%* | *34*<br>*30.6%* | *83*<br>*48.5%* | *49*<br>*44.1%* | *26*<br>*15.2%* | *22*<br>*19.8%* | *12*<br>*7.0%* | *6*<br>*5.4%* |
| *3. treat me as if I am stupid* | *35*<br>*20.5%* | *26*<br>*24.1%* | *49*<br>*28.7%* | *31*<br>*28.7%* | *41*<br>*24.0%* | *19*<br>*17.6%* | *44*<br>*25.7%* | *32*<br>*29.6%* |
| *4. favour boys in class* | *27*<br>*16.4%* | *13*<br>*12.1%* | *42*<br>*25.5%* | *21*<br>*19.6%* | *43*<br>*26.1%* | *45*<br>*42.1%* | *52*<br>*31.5%* | *28*<br>*26.2%* |
| *5. do not tolerate girls misbehaviour in class* | *25*<br>*15.9%* | *11*<br>*10.0%* | *45*<br>*28.7%* | *30*<br>*27.3%* | *47*<br>*29.9%* | *37*<br>*33.6%* | *39*<br>*24.8%* | *32*<br>*29.1%* |
| *6. my biology teacher is excellent* | *58*<br>*53.8%* | *60*<br>*51.1%* | *40*<br>*25.3%* | *30*<br>*27.0%* | *21*<br>*13.3%* | *11*<br>*9.9%* | *12*<br>*7.6%* | *10*<br>*9.0%* |
| *7. my chemistry teacher is excellent* | *80*<br>*46.5%* | *55*<br>*48.2%* | *77*<br>*44.8%* | *43*<br>*37.7%* | *12*<br>*7.0%* | *11*<br>*9.6%* | *3*<br>*1.7%* | *5*<br>*4.4%* |
| *8. my physics teacher is excellent* | *59*<br>*34.7%* | *32*<br>*29.1%* | *61*<br>*35.9%* | *44*<br>*40.0%* | *28*<br>*16.5%* | *27*<br>*24.5%* | *22*<br>*12.9%* | *7*<br>*6.4%* |
| *9. Add your own view* | | | | | | | | |

***NB: The missing percentile belongs to those who chose not to respond to the questions***

Although there is a slight difference in the number and in the degree of agreement and/or disagreement between males' and females' responses, pupils overall seem to have similar views regarding their teachers. Hence it is possible to conclude that there is no major difference of attitude between boys and girls in regard to their teachers.

Pupils' additional views concerning their teachers were many and diverse, however, I will discuss only the most common ones. The responses obtained from the majority of the participants both in the questionnaires and in the interviews pointed out that some of their chemistry and biology teachers were very helpful to them and made a lot of sacrifices of their free time and gave extra help to those who were in need. Pupils pointed out that there were some extraordinary teachers who showed a lot of love and care towards the students and motivated them to attain good grades. However, there were a few participants who were rather unhappy about their teachers' attitude towards them and said that they were obstacles to the learning rather than being the facilitators.

### 3.5 Science curriculum

In the literature review it was pointed out that girls may be less interested in studying science. Several researches have attributed girls' poor performance in science to their lack of interest in the subject. Much of the work on attitudes is again anecdotal, but several reasons for girls' dislike of science have been suggested. These include the subject difficulty, abstractness, previewed irrelevance to daily life etc. Moreover, I would add that lack of motivation and encouragement from society may play more important roles in Eritrean girls' poor academic achievement than the subjects difficulty or abstractness.

To explore pupils' perception of the curriculum i.e., to test whether perception of subject difficulty and subject enjoyment were similar, or whether some subjects were enjoyed more by either boys or girls regardless of their perceived differences, several questions were presented to them. These included the subjects they enjoyed most and the ones they enjoyed least, the subjects they found easiest and the ones they found most difficult. Although both sexes provided slightly different responses, there is no considerable difference in the rating of subjects between them. Based on the stereotypical views, I expected the girls to like biology and to dislike physics and for boys to like physics and to dislike biology. However, although it was found that girls liked biology slightly more than did the boys, it is important to note that there was no

association between subjects which were found to be most or least enjoyed, found easiest or most difficult, identifiable to the sex of the pupils. Apart from few details, closely similar patterns are seen into the choices of the subjects. This suggests that, in general, pupils have the tendency to express less sex-stereotyped views about science.

In regard to subject difficulty, both sexes in the interviews indicated that they found physics and maths difficult. However, subjects with weak teachers, such as geography, history and English, were also disliked and consequently found difficult. What made pupils either like or dislike the subjects seem to be the teachers' personality and their teaching styles rather than the subjects, especially when these were not too difficult. For example, subjects taught by Indian teachers, no matter how easy they may have been, were markedly disliked by the majority of the pupils, especially in schools 1 and 2. This suggested that general antipathy towards Indian teachers was being reflected, rather than the display of feeling towards particular teachers or subjects. Several pupils, who were unhappy with the Indian teachers, reported negative feelings towards the subjects taught by them.

As pointed out earlier, perceptions of all learners were very similar, however, despite their similar perception about science subjects, males were more likely to be interested in chemistry and physics, in understanding science and in studying science with a career in mind. Females on the other hand, were more likely to be interested in biology and social science topics, in the social implications of science, in learning science for the sake of learning. Probably because of the traditional attitude and the belief that a woman's place is in the home, caring for the family and that science education is less important for girls, some seemed as if they were less interested in science, and did not envisage careers for themselves as scientists. However, in the interviews, there were three girls who were very committed to science subjects, had highly scientific aspirations and had specific goals in mind. These girls expressed the wish to be, 1**) a surgeon,** 2**) a pilot** and 3**) an engineer**. I will share the views of the first two because their reactions have remained very distinctively in my mind.

I specifically asked them why they wanted such high professions and they gave me responses I did not expect. While I was interviewing the one who said she wanted to be a surgeon, I made huge mistake and said some thing like, "*so you would like to be a medical doctor*". She immediately corrected me by saying: "*a surgeon not just a*

*general medical doctor!*". When I asked her why she wanted that particular job, she replied; "*Because I want to be able to remove un-healthy organs from people and make them feel healthy again*". I listened to her views attentively and to be honest, at times I did not know how to react to some of her responses, because they were so far from what I expected to hear. I hope that her goals will materialise one day. I have the feeling that this girl may be able to get somewhere with her goals because she comes from a highly educated family, her parents are well off, but above all, she is academically of a very good standard.

To the girl who said she would like to be a pilot, I asked her if her goal was realisable and she, too, like the first one, surprised me with her responses, when she made it very clear by saying: "*that is what I want to do not any other profession*". But understanding the environment she was living in and the almost impossible wish she expressed, made me feel very sad and emotional as I left the school in which she attended. The reason for my reaction is that I could see the clear goal of life of that girl and could sense her determination and high aspiration, but I could also imagine the huge obstacles she may encounter and the frustration she may get in the process, if she ever did get where she wanted to. The question of how far this girl will keep her goal alive and how far she could walk in the path of high hope does not abandon me. These girls have helped me to reflect more about the thousands of other girls like them who may start with very high aspirations but in the end as they grow up, they encounter the sad reality of many women who started like them but could not fulfil their wishes.

### *3.5.1 Classroom interaction*

The dynamics of classroom interaction between pupil and teacher are significant in affecting pupils' motivation, engagement and achievement. Hence, it is possible that poor pupil-teacher interaction affects achievement of both boys and girls at lower attainment levels. To find out their classroom dynamism and learning styles, pupils in this section were asked to state how they liked their science subjects teaching and their responses are presented in the table below.

***Table 11***

| ***Do you like how science subjects are taught?*** | ***Biology*** | | ***Chemistry*** | | ***Physics*** | |
|---|---|---|---|---|---|---|
| | ***Male*** | ***Female*** | ***Male*** | ***Female*** | ***Male*** | ***Female*** |
| ***Yes*** | *112*<br>*75.8%* | *87*<br>*80.6%* | *121*<br>*76.6%* | *87*<br>*84.5%* | *96*<br>*60.0%* | *62*<br>*60.8%* |
| ***No*** | *39*<br>*24.2%* | *21*<br>*19.4%* | *37*<br>*23.4%* | *16*<br>*15.5%* | *64*<br>*40.0%* | *40*<br>*39.2%* |

As the figures indicate, biology and chemistry teachings were liked by most of the participants in the study; however, when classified by the sex of the pupils, it was found that a larger percent of girls than boys indicated that enjoyed them. Physics on the one hand, was enjoyed less than biology and chemistry, but it was almost equally liked by both sexes. What is interesting in these responses is that over all there is no significant difference in the views of boys and girls concerning the questions asked up to this point, however, a higher percent of girls than boys demonstrated that they enjoyed chemistry and biology teaching. This can be interpreted that although boys and girls develop similar interests towards the subjects they learn in school, girls may have the tendency of expressing more positive views than do some boys.

Pupils' responses in general indicate that over all science teachers are good and they do their jobs well. However, as indicated by some pupils in the interviews, most teachers seem to lack sufficient teaching materials to be able to teach effectively, and as a consequence, they fail to obtain good results from their pupils.

### *3.5.2 Science laboratories*

Science labs are places where many aspects of the science inquiry involved in doing science observations take place. Ocham (1990: 38) points out that there is a strong belief among science educators that all science teaching should take place in the laboratory. He furthermore, writes that science belongs to the laboratory as naturally as cooking belongs to a kitchen and as gardening belongs to a garden. The laboratory gives students appreciation for the subjects they learn because they can see with their own eyes what they learn theoretically. Because of these views, participants in this study were asked to state: a) if they had labs for biology, chemistry and physics subjects, b) if their labs were well equipped, and c) if their answers were positive to state how effectively their labs were used. The questions and responses follow.

Table 12

| | ***Do you have labs*** | | ***Are your labs well equipped?*** | | ***Are labs sufficiently used?*** | |
|---|---|---|---|---|---|---|
| | ***Male*** | ***Female*** | ***Male*** | ***Female*** | ***Male*** | ***Female*** |
| ***Yes*** | 111<br>64.9% | 77<br>69.9% | 40<br>30.1% | 35<br>36.5% | 70<br>35.8% | 51<br>51.8% |
| ***No*** | 60<br>35.1% | 34<br>30.6% | 93<br>69.9% | 60<br>62.5% | 82<br>64.2% | 56<br>56.2% |

Apparently most schools have nominal science labs, but they are not effectively used because most of them lack proper equipment. I have observed some of the labs and the few that I saw, I recognised were no use to the pupils, since some of them did not have

the necessary elements and others were placed in very small rooms, thus students did not have enough room inside to do experiments.

What is interesting in this section is that in all three questions, boys and girls gave slightly different responses, i.e. girls were more modest in their claims than were the boys. My interpretation to these is probably that boys were influenced more by the interest and values they placed on the need to learn science; therefore, their expectations were higher than the girls' throughout the questions pertaining to science labs. Girls on the other hand, probably had less need to experiment or may worry about doing experiments, since they do not study their science subjects enough. Furthermore, many girls do not envisage using and implementing much of the sciences they learned in schools to their daily lives.

### *3.5.3 Relevance of Science subjects*

To find out how relevant participants found their science subjects, they were asked a question in that regard. (Relevance in this context they were told, meant the usefulness and applicability or transferability of the subjects to their daily lives).

***Table 13***

| ***Do you find your science subjects relevant?*** | ***Biology*** | | Chemistry | | ***Physics*** | |
|---|---|---|---|---|---|---|
| | ***Male*** | ***Female*** | ***Male*** | ***Female*** | ***Male*** | ***Female*** |
| ***Yes*** | ***132 83.5%*** | ***103 92.8%*** | ***144 86.2%*** | ***90 82.6%*** | ***117 70.5%*** | ***73 68.2%*** |
| ***No*** | ***26 16.5%*** | ***8 7.2%*** | ***23 13.8%*** | ***19 17.4%*** | ***49 29.5%*** | ***34 31.8%*** |

The figures indicate that although both genders found all sciences relevant to their daily activities, girls found biology and boys found chemistry and physics slightly more relevant. Here the views of boys and girls have resulted pretty much as they were predicted. The expectation was for boys to report more relevance in chemistry and physics and girls in biology. The emphasis on relevance in biology but less in physics and chemistry by girls, indicate that they (girls), despite their liking the science subjects were less challenging the traditional assertion of chemistry and physics as male preserves.

### *3.5.4 Subject difficulty*

Science subjects are difficult on their own, but they were expected to be doubly difficult for the participants in this study, because Eritreans have to learn them in English, a language they are not fluent at. Let alone the secondary school pupils, even some of the teachers do not have a good command of the language they teach in. Based on this and

on what I have understood from the informal conversations with some pupils prior to the plan of the instruments for this study, I included some questions concerning the complexity of science subjects. These questions were set to investigate whether the subject or the language difficulties were the factors for the pupils' lack of achievement in science. The questions and the responses follow:

***Table 14***

| *Do you find the **content** of your science subjects easy to understand?* | | | *Do you find the **language** of your science subjects easy to understand?* | | |
|---|---|---|---|---|---|
| | ***Male*** | ***Female*** | | ***Male*** | ***Female*** |
| ***Yes*** | ***116***<br>***70.3 %*** | ***77***<br>***72.8%*** | ***Yes*** | ***139***<br>***83.7%*** | ***88***<br>***80.0%*** |
| ***No*** | ***49***<br>***29.7 %*** | ***29***<br>***27.4%*** | ***No*** | ***27***<br>***16.3%*** | ***21***<br>***19.1%*** |

From the pupils' responses it can be concluded that the majority did not suffer from either of the factors proposed above. Since neither the subject complexity nor the language appeared to be obstacles to the majority of the participants learning of science, the next questions will deal with their classroom exam-grades and their self-confidence in their academic attainment.

Pupils in Eritrea take regular classroom exams but at the end of $11^{th}$ grade, they take national exams, ESECE, which are the deciding factors for their admission to the university. To find out how pupils' classroom/school exam grades were in the different science subjects, they were asked to indicate their grades by choosing appropriate answers i.e., high, average or low. In response to these, the majority (more than 75% of all participants) said they had grades, which were between high and average, but it was not possible to test how honest they were about their grades. Furthermore, to determine how confident they were about passing their national exams, participants were asked: Are you confident that you will pass the ESECE exams? Not surprisingly their responses were unrealistically optimistic.

The question and numbers of the respondents are in the table below.

***Table 15***

***Are you confident that you will pass the national exams (ESECE)?***

| **Response** | **Male** | **Female** |
|---|---|---|
| **Yes** | **129**<br>**79.1%** | **80**<br>**75.5%** |
| **No** | **31**<br>**19.0%** | **24**<br>**22.6%** |

Their responses in regard to the question are very high and similar responses were obtained also in (Ogubazghi and Holmes 1998). However, despite their high confidence, no matter what the number of the candidates have been, those passing the famous ESECE exams have never exceeded 14% (See tables 2-6 in chapter three & appendix 5).

One of the reasons for the pupils' failure was thought to be the lack of confidence in their ability to pass, hence failure to study properly; however, from the responses of the majority it can be concluded that lack of self-confidence cannot not be a factor for their failures. To explore other possibilities as to why they demonstrated such high level of self-confidence, candidates were asked to state the reasons why they felt that they would pass the exams. Their main reply was because they were studying hard. From their responses it is possible to conclude that lack of assistance, lack of time to study, lack of confidence or subject difficulty, do not seem to be major causes for their poor attainment in science. However, since the results pupils attain every year are not satisfactory, I feel that there is a need to conduct further research to find out why there are such contradiction.

In responding to most of the questions asked up to this point, participants have shown favourable views by demonstrating that the problems indicated above did not affect them. Reflecting upon their positive replies, I started to wonder if the participants and I were communicating in the same language, because my expectations in the light of some studies were different from the replies I obtained. Therefore, I question whether some pupils may have been deceiving themselves believing that:

- *science subjects were easy*
- *their grades were honestly between high to average*
- *their high levels of confidence to pass the national exams were realistic.*

An alternative explanation could be, that the majority were economical with the truth about some of the responses in the questionnaires, for the mere fact of saving their faces or the exams were beyond the pupils' level. Because, if all the pupil's responses were as they have pointed them out to be, we would see many of them passing the national exams in science subjects, but unfortunately we do not.

The reasons why I start to wonder about the pupils' responses are: a) in general it is not customary in the Eritrean culture to expose one's own family, one's own weaknesses, or

one's own school's weaknesses to the public, b) pupils may have thought that they were giving the right responses because that is how they saw themselves and their families, c) they may have been unsure of how to act, since for most of them it was their first time to participate in a research project.

### *4. Gender and learning*

This section has three subsections namely pupils': degree of participation, perceptions about intellectual abilities and differential treatments.

The feeling among the pupils, especially among those who participated in the interviews and in the informal discussion, seemed that teachers in Eritrea favoured boys in science classes, rather than treating all children equally. To test whether this was the experience of the participants in this study, also in the questionnaires they were asked to comment on the issue. Here, 75.7% males and 64.2% females said teachers favoured boys, but 17.8% males and 17.3% females said they favoured girls, the rest declined to respond. When the respondents were asked to give reasons why they thought teachers favoured either boys or girls, in summary they said that teachers favoured boys because:

- *girls were shy and did not participate so actively as boys did*
- *most science teachers were males so they relate to boys better than to girls.*

Others said teachers favoured girls because:

- *girls do not take enough time to study at home so teachers try to help them in class,*
- *society does not encourage girls to achieve good standards, hence, some teachers try to make up for that.*

Besides what is indicated above, teachers' attitudes, including those of both men and women, may merely reflect rather than question, the gendered attitudes prevalent in the wider society. Based on this, it was expected that some teachers may consciously or unconsciously treat boys and girls differently; however, it was shameful to find such high percent of the pupils have experienced their teachers' negative attitude towards them just because of the children's sex. It is sad to learn that such a large number of teachers, like the society at large, discriminated against pupils in science classes. If this is true, it is very significant because it exposed the girls to be caught between two fires i.e., unequal treatment by the society at large and by the science teachers in the

classrooms. As pointed out earlier in this chapter, the factors for girls' poor science performance can be many, but nothing equates to the effect of a negative experience caused by discrimination from within school environments. Unfortunately, it seems to be the sad truth why Eritrea is obtaining poor results from its female student population.

## 4.1 Pupils' degree of participation

It is believed that girls do not participate as actively as the boys in science classes and to obtain the pupils' views about the issue, several questions in regard to it were asked. One of the questions was; do boys or girls answer more frequently to the teachers' questions in science classes? The responses to the questions are in the table below.

***Table 16***

| | ***Boys*** | ***Girls*** | ***Both participate equally*** |
|---|---|---|---|
| ***Male*** | 105<br>91.3% | 9<br>7.8% | 1<br>0.8% |
| ***Female*** | 75<br>85.2% | 9<br>10.2% | 4<br>4.5% |

Similarly another question as follows was asked: who (between boys and girls) asks more questions in class? The responses follow.

***Table 17***

| | ***Boys*** | ***Girls*** | ***Both participate equally*** |
|---|---|---|---|
| ***Male*** | 130<br>87.8% | 16<br>10.8% | 2<br>1.3% |
| ***Female*** | 91<br>90% | 9<br>8.9% | 1<br>0.9% |

Their responses were not too far from what was expected, i.e. girls participated less because they were shy to speak in public but above all they participated less because they did not study their subjects enough because they lacked both motivation and time to focus on their school works. Furthermore, to explain why many girls did not participate in class as actively as the boys, pupils offered the following views:

- *there were more boys than there were girls*
- *boys were more intelligent than girls*
- *teachers looked down upon girls and were less likely to take their questions and answers seriously*
- *girls were shy to speak up*
- *some pupils were not too attentive to the lessons*

Reflecting about the girls' lack of active participation in science classes, I started to wonder if they were failing to see any light through the tunnel of education and so resigned themselves to the concept of learned 'helplessness' as indicated by (Aschroft et al. 1996: 108). These include the informal messages they receive from teachers, peers

and parents in studying science subjects, which are likely to lead to success in future employment.

In this study, girls are reported as not participating enough in class for the simple reasons that they are shy, that they do not take enough time to study and that society does not expect or encourage them to achieve good standards in secondary education and above. However, reflecting on the post-structuralist theory, e.g. according to (Jones 1993), girls can no longer be seen as simply socialised in their appropriate gender roles. Despite the post-structuralist theory, although there are a minority of Eritrean females, e.g. the ex-female fighters, who tried to live up to their values, following their own norms, overlooking the traditional culture, unfortunately the majority seem to remain subordinated to the cultural practices without offering any question or resistance.

### 4.2 Pupils' perception about intellectual abilities

Since a consistent achievement differences between boys and girls was observed in secondary school level particularly in sciences subjects, participants were asked to state if they thought that males and females were intellectually different from each other. To this 61.0% males and 53.3% females said they were not, 37% males and 37.4% females said they were, but the rest declined from responding.

It was quite surprising to find that as many as 37% of the pupils believed in natural difference of intellectual ability between males and females. This view is a very important factor in determining whether individuals would challenge themselves or anyone else, if they thought that they where naturally less gifted to achieve. However, if any one believes that he/she or others have equal natural intellectual ability, he/she will challenge ones self and/or others to work harder to attain good results.

The participants who said that males and females had similar intellectual ability were asked to give explanations as to why, they thought, there were different results in secondary science subjects. Their responses were as follows:

- *Girls are not encouraged enough & do not take enough time to study*
- *Parents expect girls to do the house chores instead of studying*
- *Girls are careless, they do not worry about their education, they worry mostly about their future (married) life*
- *some pupils, especially girls, lose hope and decrease their effort to study*
- *Because of the ways they study*
- *Because of poor teaching methods*

In an attempt to further explain why they thought that boys and girls developed different attitudes towards secondary science subjects, a development which appeared to have led the girls to participate less actively in the classrooms as well as attain lower grades, pupils came up with a variety of responses. When their arguments from the interviews and the questionnaire responses were summarised and classified by their genders, some boys were found to say that girls lacked intelligence as well as motivation. Girls on the other hand, felt that their problems were lack of time as well as motivation. In the end although males and females took different directions, they both agreed that girls spend too much time at home doing non-school work, instead of studying their subjects.

### *4.2.1 Factors for school drop outs*

The combined efforts aimed at having all children attend school must go hand in hand with appropriate strategies to keep them from dropping out of school. Besides this study suggests that young women leave school for reasons linked to the education system. Discussion about those who had dropped out of school revealed that, while for some it was to help their family, for many, especially for the girls, it was because parents discouraged them from continuing their education by marrying them off at a young age. In conclusion schools as well as the society at large must encourage all pupils to stay at school and achieve as much as they possibly can.

It was observed that in the past few years many secondary school pupils were dropping out of school because of subject difficulty. To find the reason behind these factors, participants were presented with a question and multiple-answers from which to choose. The questions and responses follow:

***Table 18 a&b***

| ***Girls drop out of school as it gets harder because they:*** | ***Lack ability to succeed*** | | ***Lack motivation*** | | ***Lack time*** | |
|---|---|---|---|---|---|---|
| | ***Male*** | ***Female*** | ***Male*** | ***Female*** | ***Male*** | ***Female*** |
| | *25*<br>*15.9* | *15*<br>*14.4* | *67*<br>*42.7* | *25*<br>*24.0* | *65*<br>*41.4* | *61*<br>*58.7* |

| *Boys drop out of school as it gets harder because they:* | *Lack ability to succeed* | | *Lack motivation* | | *Lack time* | |
|---|---|---|---|---|---|---|
| | *Male* | *Female* | Male | *Female* | *Male* | *Female* |
| | *34*<br>*21.3* | *40*<br>*39.2* | *78*<br>*48.8* | *37*<br>*36.3* | *43*<br>*26.9* | *23*<br>*22.5* |

In response to the questions above, boys and girls have taken different directions. Referring to themselves, girls said they drop out due to the following factors ordered in rank:

- *1st lack of **time** to study*
- *2nd lack of **motivation***
- *3rd the lack of **ability** to learn.*

Whereas in regard to boys, the girls suggested that they drop out due to:

- *1st lack of **ability***
- *2nd lack of **motivation** and*
- *3rd the lack of **time**.*

Boys on the other hand, assumed the factors for their own academic weakness and dropping out, to be the same both for themselves and the girls:

- *1st lack of **motivation***
- *2nd lack of **time** and*
- *3rd lack of **ability**.*

It was interesting to find that girls have focused on the lack of time as the first and most important factor for their own academic weakness and drop out, but put it as the last factor for the boys. Boys on the other hand, have said that the factors for their own and the girls' academic weakness were the same thing, i.e. 1st lack of motivation, 2nd lack time and 3rd lack of ability. This brings us to a conclusion, that Eritrean boys and girls live different experiences, therefore sometimes interpret the situations differently.

### *4.2.2 Pupils' study time*

The proposed hypothesis for girls' poor attainment in secondary science, are lack of motivation and time. Moreover, since there were complaints from some pupils who said they suffered from shortage of time to study, these participants were asked to share their views on the issue. The questions and responses are in the tables below.

***Table 19***

| *Do all pupils have equal time to study?* | | | | *Who do you think gets more time to study?* | | |
|---|---|---|---|---|---|---|
| | *Male* | *Female* | | | *Male* | *Female* |
| *Yes* | *46*<br>*27.1%* | *25*<br>*23.1%* | | *Male* | *97*<br>*75.2%* | *67*<br>*72%* |
| *No* | *123*<br>*72.4%* | *83*<br>*76.9%* | | *Female* | *32*<br>*24.8%* | *26*<br>*28%* |

As expected only about 25% of the respondents thought that pupils had the same amount of time to study, but the majority, i.e. about 75% of them revealed the disparity of the time experienced by boys and girls. The responses to these questions were not too far from what was expected, in which over 70% of the respondents pointed out that girls suffered from shortage of time to study. However, it was interesting to find that 28% female as opposed to 24.8% male respondents, said girls had more time than boys. These responses puzzled me because I did not expect girls to report more positively than boys in this respect. However, since girls have consistently tried to be more modest in their claim than the boys in most of their replies, it should not be a surprise any more.

### 4.3 Pupils' differential treatment

This part brings us to one of the key questions in the study which is; Whether the inequalities in secondary school science performance between boys and girls, reflect the gender inequalities in the society?

In the international literature, e.g in (Salisbury et al. 1999: 409), it is suggested that whether interactions were teacher or pupils initiated and regardless of nationality or year of publications, curriculum area studied, or the socio-economic status or age composition of economic status or age composition of the sample, boys were consistently more likely to receive more attention from the teachers. Moreover, in the UK, (Kelly 1981), also calculated that the difference represented a deficit of 30 hours of education for girls. To find out if Eritrean pupils were receiving the same treatment from their teachers as well as the society at large, candidates were asked to share their views on the issue. To this question, 52.8 % males and 48.0% females said that society discriminated against girls but 44.8% males and 48.0% females did not think there were problems of that sort. The former group i.e. those who said the society discriminated against girls, pointed out that parents/society:

- *gave too much work to girls at home rather than leaving them free to study*
- *married the girls off at an early age*
- *did not allow girls to study in the libraries, especially in the evenings*
- *encouraged boys to succeed, but did not encourage girls the same way and*
- *society thought that a female doctor may not be as good as a male doctor.*

The only one reason given by those who thought that Eritrean society gave equal treatment to both boys and girls was that:

- *schools were open to both sexes and both sexes attended them.*

It is odd to observe that this group equated the usage of the same spaces in the classroom with equality. Although it is a good initiative to allow boys and girls attend the same schools, my argument is that equality cannot be limited to the usage of the same space by males and females. All pupils must also be treated equally in every other respect if they are expected to produce similar results in their education. However, although many Eritrean females are allowed to study, parents are more likely to keep a tighter control over their daughters than over their sons.

The reason why I think that girls are kept in tighter control is that our society feels girls must be marriageable. Indeed, in order to be marriageable a girl must fit the model of an ideal woman. This can be: good looking, healthy, childbearing, hardworking, humble, obedient, self-sacrificing, hospitable, good cook, perfect homemaker. The listing goes on and therefore a girl must fit the model. As indicated earlier in the thesis, post-structuralists do not see a one way formation of children as passive receivers; they believe in dynamism of interaction between parents, teachers and the society's values, which form the attitudes of the growing children. Unfortunately, the dynamism of children and adults especially the dynamism of a girl-child seems to be directed one way. That is to say, society imposes an informal law on females who accept without questioning too much. Therefore, the country continues to produce fewer women with the virtues listed below, i.e. fewer women who can be ascribed with qualities such as: bright, creative, assertive, outspoken, high-achiever, decision-maker, charismatic leader, strong, etc. It may not mean that women with the qualities listed above are in short supply; what it means is that they are not encouraged to make news, influence others thus increase in number.

### *5. Comparison between questionnaires and interview results*

Observing the questionnaire responses, it is possible to understand that most of the participants (boys and girls), particularly girls, have tried to maintain a positive side by trying to be always unassuming. Most have consistently tried to appear as modest as they possibly could, probably to emerge prudent, because that is what the society expects of them as females. Appearing controlled is more important than expressing one's honest feeling in the Eritrean society, particularly among the females; therefore, I worry that some of the responses I obtained in the questionnaires may lack integrity.

Hence, I will think twice before setting such instruments for a survey the next time I do research in Eritrea.

I launched this research thinking that females were disadvantaged because I thought that they were not motivated enough by their families in particular and by the society in general. However, observing some of the issues raised in the questionnaires, for example, mentors in the family, the academic help received at home, the amount of time they had for studying, girls consistently appeared to be advantaged. At this point I question whether these findings are just coincidental or whether it was only my understanding that Eritrean secondary school girls were disadvantaged, when they actually are not. Although it is possible that some girls may have received enough help from their family, I am of the view that the participants in this study were trying to be modest in their expression just so to fulfil the traditional views or norms and to save their faces.

In the interviews and in the informal interaction, most pupils (both sexes) appeared rather unhappy about their schools in general. For example they stressed that their schools needed improvement in every aspect, especially in providing effective rules and regulation and in creating a favourable learning atmosphere, but when asked to give their replies in writing (in the questionnaires), the majority surprised me with their positive responses. In the questionnaires they wrote that their grades were between high to average and in regard to science subjects they said that both the content and the language were easy to understand. Conversely in the interviews they said science subjects were found difficult to understand and the yearly national exam results are the proof that they found them difficult.

Despite the fact that the interviewees were told the reason behind the research, possibly due to the fact that some have never participated in a survey before, they appeared to have hopes that I would solve their problems, they felt the need of sharing their stories. In fact some pupils were so eager to talk about their school problems, that a couple of them invited themselves to come for interviews because they felt that finally someone had become interested in their problems and was ready to consider their views. In their talk, some pupils sounded unhappy when they said that too little attention was given to their problems by the school administration; however, none of these views appeared in the questionnaires' responses.

Most of those who were interviewed had different views from those who participated in answering the questionnaires. With some interviewees, especially with some pupils in schools 1 and 2, a lot of frustration was expressed about their schools, particularly about some of their teachers' attitudes towards them. Overall, pupils' responses appeared more spontaneous in the interviews than they were in the questionnaires. The reasons for this claim is that responses in the questionnaires were found to be unrealistically positive compared to those in the interviews. Although pupils were told that no one other than myself would read their responses, it is possible that some were afraid to put negative views in writing because:

1) *they have never been asked to evaluate their school or teachers before*
2) *they feared negative consequence for condemning their schools.*

In an attempt to respond to the question why pupils' responses were different in the interviews from the questionnaires, I thought of various possible reasons. Some of which could have been the methods and the settings for the data collection. The interviews with the exception of school 2, (in which pupils were interviewed in a classroom), all took place outside of classroom settings. Places for the interview were different depending upon the environment. These included, the sisters' convent, school compound, empty staff-rooms, or in some quiet place like, school staircases. Besides, although there were a couple of instances in which pupils were interviewed in groups of boys or girls, unless they chose to be interviewed with their friends, they were encouraged to come along individually, thus most interviews were conducted on a one to one basis.

Questionnaires on the other hand, were answered in classroom-settings and pupils seating arrangements were similar to how they sit when they take their final exams. Furthermore, the questionnaire patterns followed the national exam setting. Therefore, although pupils were assured that they were not exams and that it was more important to give ***honest*** answers rather than trying to give ***right*** answers, they probably still associated them with exams. Hence, it appeared that they tried to respond with what they thought were the correct answers and how things ought to be rather than trying to reflect the actual situation.

Another reason, why I think that students confused the survey with the exams is because some asked me how long it would take me to mark their papers and to let them know

their results. I tried to explain to them that the questions were only exercises to find out about how they saw their schools, their teachers, themselves etc. and possibly come up with recommendations based on the findings. But I had the feeling that they did not fully understand what I was talking about because for most of them it was their first experience in taking part in any survey studies. Another interesting observation is also that some of those who could not participate in the filling of the questionnaires or the interviews felt left out.

Some other reasons why I suspect that pupils' responses could have been more reliable in the interviews than in the questionnaires are my being a religious sister and an educator at the only higher institute of education in the nation, i.e. the University of Asmara. Religious sisters in Eritrea have the reputation of commitment to serving the needs of the people, each in their capacity. Thus the people have great respect and trust in them. It is possible that the attribute that religious sisters enjoy and my professional position, increased the pupils' trust and encouraged them to share their opinions more freely. However, even though pupils' responses in the questionnaires and in the interviews did not match or correspond to my expectations, nonetheless, I feel that there is an advantage in combining the two approaches.

### *6. Aims for the study*

The aims of this study are:

1. *To explore reasons for gender disparities in achievement in Eritrean secondary science,*
2. *To identify Eritrean pupils', particularly girls' constraints in science learning*

In an attempt to present the aims of the study in a summary form, I will present the findings in the subsequent paragraphs.

Gender disparities in achievement in secondary education were caused both by the outside and inside school factors in which parents and teachers failed to give equal treatment to boys and girls. Parents failed to convey the same messages to girls as they did to boys. Besides, parents made girls work more in the house to help their families, while boys were allowed to mind their own affairs. Boys could spend as much time as they wanted on their school work and they could take time to play their games, while girls spend a lot of their time helping their families. Moreover, boys were encouraged to

study all subjects, especially science, because they are expected to be future scientists, while girls were laughed at if and when they said that they wanted to be scientists or engineers. Besides the messages girls received at home and among their families, they also received differential treatment from their science teachers in science classrooms. The findings indicate that teachers interacted more with boys than they did with girls and at times they discouraged them with their negative attitudes and sarcastic comments.

Although the findings indicated that girls by nature had need of more attention than the boys, they did not seem to receive it from either their parents or their teachers. Moreover, because girls had low expectations of their education they had a negative attitude towards science learning. Furthermore, they were found to be less motivated to study; and appeared to put less effort into their education. Hence, overall girls lacked determination and worked less hard than boys, as a consequence they obtained lower grades than the boys. Besides it was pointed out that girls were shy and participated less actively than boys even those who were as clever as the boys failed to participate as actively as the boys because they felt overpowered by the number of male students. But above all girls studied less because they did not envisage career of scientists for themselves.

In the literature chapter it was pointed out that in the Western research teacher's attitudes can be a powerful stimulus to all pupils, especially girls' success or failure. It is thus reported that teachers can unintentionally, reinforce stereotyping of school subjects by their assumptions about pupils' abilities and interests, (Whyte 1984), (Harding 1996) and (Murphy 1997). Moreover, in the Developing world e.g. in the Caribbean countries and in this study, it was pointed out that the didactic nature of teaching required that the teacher 'calls upon' students to answer questions. In most instances teachers selected a child who raised his/her hand and who was likely to know the answer. Thus teachers were likely to select children of higher attainment, as they were most likely to provide the correct answer, inevitably, those chosen were girls in the Caribbean context, (Kutnick 2000) but it was the boys in the case of Eritrea. Students that could not answer or answered incorrectly were quickly 'told off', but not informed as to how to arrive at the correct answer. Students who did not participate were ignored by the teacher; in effect, students who 'opted out' of participation were

left alone by the teacher and not provided with positive means to solve the problems or answer the questions.

The studies from the Caribbean countries were selected because they are from the Developing counties, hence thought to be similar to Eritrea in some ways. However, probably because of the different traditional practices and the family values observed in the different countries, the findings were in total contrast to each other. Possibly because Eritrean society focuses on the observation of the patriarchal tradition and does not give equal treatment to males and females, girls were found to under-achieve in almost all subjects while it was the opposite in the case of the Caribbean countries.

An international research (Renee's 1996: 74), stressed that all classroom observations revealed that teachers in science subjects unconsciously interacted far more with male students, whether in contacts initiated by the teacher or in response to the spontaneous behaviour of the boys. What's more, the teachers gave them far more encouragement, and these differences in treatment increased with the age of the students. In the same report, a survey of a geometry class in a high school showed that girls received 30% of encouraging remarks and 84% of discouraging remarks, while 70% of persistent interaction concerned boys, who were also the only ones involved in contacts lasting over five minutes. The same trends followed for physics class, where there were 50% more verbal exchanges between teachers and boys, three times more criticism aimed at boys and more simple questions addressed to girls. Surprisingly, opposite to the findings of this study, was found in Kutnick's research, in which teachers interacted more with girls than they did with boys. They encouraged girls, while they ignored the boys, because boys did not participate as actively as the girls did. Teachers called more upon girls to respond to any challenging science questions, because they (girls) came to class more prepared than boys to actively participate.

To the contrary of what is reported in Kutnick's account, there is evidence that Eritrean females have a different experience of education from males and that they attain different results. Furthermore, girls and women tend to underachieve in technology and science, they tend to receive much smaller proportion of tutor attention than males, and so end up being taught less is also pointed out in the UK (Delamont 1990). (Deem 1984) and (Kelly 1981). The attitudes of teachers to girls in science and technology can

be crucial in determining whether they will decide to continue their studies in these areas.

### *7. Summary*

In this chapter the majority of the participants, especially the mothers, were found to have very little formal education. However, more parents of girls than parents of boys were found to have secondary education and above. Nevertheless, it was indicated that more boys than girls have received encouragement from the parents to achieve good results in their secondary education. Most if not all Eritrean Secondary school age children, especially those from the rural areas help their families at home and this study indicated that a large number of pupils helped at home on regular basis, i.e. three hours or more per week. However, the percentage of girls who helped at home was almost double that of the boys. This study further indicated that poor teacher-pupil interaction affected both girls and boys at lower level attainment, moreover, girls were affected more than the boys. This study also indicated that girls were less active in their science classes and achieved less than boys. Besides, researches from national and international surveys showed evidence of children's different early experiences to affect their science attainment for boys and girls. Moreover, it was pointed out that girls may be less interested in studying science. Furthermore, although both sexes found all the science subjects relevant to their daily lives, girls found biology and boys found chemistry and physics slightly more relevant. Besides, probably influenced by more interest and values boys place on the need to learn science, their expectations concerning the laboratories were higher than the girls' throughout the questions pertaining to science laboratories.

Pupils were invited to give their own views concerning their schools. Those who thought their schools needed improvement, especially pupils in schools 1, 2, and 3, where the majority of the participants in the study were from, strongly emphasised the need for renovation of their school buildings, provision of updated learning material and better teaching staff.

There are a substantial number of Indian teachers working in most Eritrean secondary schools and several pupils complained about them. Besides their being unable to

understand the Indian teachers' English pronunciation, pupils said these teachers displayed a rather negative attitude and this created some kind of antagonism between the students and the teachers.

Given the consistent achievement disparity between Eritrean boys and girls in secondary schools, participants were asked to state if they thought that males and females were intellectually different from each other. Most of the respondents said that they were not different and they gave the following reasons for their different attainments. These points include:

- *Girls are not encouraged enough & do not take enough time to study their subjects*
- *Parents expect girls to do the house chores instead of studying*
- *Girls are careless, they do not worry about their education, they mostly worry about their future (married) life*
- *Some pupils, especially girls, lose hope and decrease their effort of studying their subjects.*

From the pupils' responses, it is possible to understand that most of the participants, particularly girls, have tried to give positive views in the questionnaires by trying to be as moderate as they possibly could in their claims. Thus they appeared to have little or no problems with their schools or with their teachers. In the interviews and in the informal interaction, on the other hand, most of them demonstrated rather negative views about their schools in general, about their Indian teachers in particular. Moreover, in the questionnaires, pupils' views in regard to science subjects emerged easy, conversely, in the interviews, science subjects come forth as difficult.

## *8. Concluding remarks*

This chapter started with exploring the views of the pupils, collected by means of questionnaires completed by the pupils and interviews conducted by the researcher. The data was collected from six Eritrean secondary schools. Pupils' questions in this chapter were designed to test some assertion of the Eritrean society, that boys and girls have different attitudes and values and that girls lacked ambition.

Therefore, the finding in this chapter is based on the view of Eritrean $10^{th}$ and $11^{th}$ grade pupils and the issues discussed were: the participants' home environment, their parental, educational level, parental employment and involvement in their children's education. It further discussed the pupils' educational and occupational aspirations, their school

experience, whether they liked their subjects and teachers, their views as to why boys and girls attained different grades, etc. Although there was some minor difference in the views of boys and girls, over all they provided similar responses. In an answer to the questions why boys and girls attained different grades, the pupils gave similar responses in that they said girls were achieving less because the culture was not very helpful to them. They said that the society as well as some teachers discriminated against girls.

This chapter discussed the secondary school pupils' views and the next chapter will take us to see the university students' views.

## 2. General information

This section has three sub-sections which: are parental education, study time and favourite subjects and teachers.

The tables indicate the number of the participants by their gender, their level of education, their majors and the places where they attended secondary education.

***Table 1***

***Year of study by gender***

| Year | Male | Female |
|---|---|---|
| $2^{nd}$ | - | 4 |
| $3^{rd}$ | 3 | 1 |
| $4^{th}$ | 12 | 6 |
| Not stated | 2 | 4 |

***Table 2***

***Students' major***

| | Male | Female |
|---|---|---|
| Biology | 4<br>24% | 6<br>40% |
| Chemistry | 6<br>35% | 6<br>40% |
| Physics | 7<br>41% | 3<br>20% |

***Table 3***

***Participants' secondary schools***

| | Male | Female |
|---|---|---|
| Did not identify their schools | 1 | 1 |
| Addis Abeba | - | 1 |
| Adikeih | 1 | 1 |
| Adiquala | - | 1 |
| Adiugri | - | 1 |
| Assab | - | 2 |
| Asmara comprehensive | 5 | - |
| Barka | 4 | 4 |
| Denden | 1 | 1 |
| Halai | 2 | - |
| Keren | - | 1 |
| Ibrahim Sultan | - | 1 |
| Isaac Teweldmedhin | 1 | - |
| Semaetat | 1 | 1 |

According to Robinson (1993: 289) there is considerable evidence of association between the students' academic achievement and parental educational background. This view seems to be reinforced by the quotation below taken from the 'Needs assessment of the female students at the University of Asmara' (1998: 11):

> *The differences in characteristics between female and male students continue with an analysis of parents' education. More than 60% of the female students*

Students who spent more time studying chemistry than either physics or biology gave the following reasons.

- *Chemistry was my favourite subject and I was interested in the content it discussed.*
- *My chemistry teachers were not as good as my physics and/or biology teachers, so I spent most of my time trying to understand chemistry.*
- *My favourite subject used to be physics, but now it is chemistry and this is due to an influence of a good female teacher who was a university service student.*

[University service students are the students who were sent to the different secondary schools to (teach) give one year of national service prior to their graduation].

- *Chemistry, because it is about things which are both inside and outside our body, yet we neither see them nor are we aware of their existence and function.*
- *The main reason why I liked chemistry is that it is all about calculation which I liked very much, moreover, I happened to learn from a clever teacher in grades 9 to 11 and I became interested in listening to him.*

And students who spent most of their time studying biology also gave the following reasons:

- *Biology is about living things and the things that surround us; moreover, I had the chances to practice them in my daily life.*
- *I was very interested in biology and had marvellous teachers in the subject.*
- *My favourite subject is biology because it deals with nature, which surrounds us. I love nature and like to explore it.*
- *Biology is my favourite subject because it is the closest subject to medical science, which is a profession I hope to join.*

Many of their responses indicate that they were motivated by different factors which include, personal interest in the subject, future job aspiration, satisfaction from exercising the subjects; nonetheless, the majority studied the subjects because they were motivated by their teachers. Being an educator and a believer in motivating learners to like the subject they study, I was happy to find such observations come from the students. Unfortunately, there were also those who studied hard because they had unskilled teachers. In conclusion these responses point out that there is no universal answer why learners prefer to spend more time studying one subject rather than another; however, these responses gave an indication that physics is found to be the most difficult subject and most students spend their time studying it.

### 2.3 Favourite subjects and subject teachers

As indicated in chapter five, subject liking can be associated with the liking of one's teacher. Based on this belief, students were asked to state: a) their favourite subjects among the core courses and b) their favourite subject teachers. The percentages of the respondents are presented here below.

***Favourite subjects***
Physics 13 (40.6%)
Chemistry 11 (34.4%)
Maths 11 (34.4%)
Biology 7 (21.9%)
English 3 (9.4%)
All subjects 1 (3.1%)

***Favourite subject teachers***
Chemistry 10 (34.5%)
physics 8 (27.6%)
maths 5 (17.2%)
biology 4 (13.7%)
English 2 (6.9%)

Based on the belief that physics, math and chemistry were tough subjects, I expected these participants, to dislike them; however, they surprised me with their responses, because they were their favourite subjects and taught by their favourite teachers. Similar findings were reported also in chapter five and in (Ogubazghi and Holmes 1998), especially with regards to mathematics and physics.

English, as a subject and the teachers who taught it, were rated as the least favourite. There may be a need for further research to find out whether the disliking of the subject was attributed to the disliking of the teachers or the other way round, although most probably the positions are reciprocal. My interpretation for students disliking English is that the subject is difficult for many Eritrean youth, because it is the medium of instruction for all subjects in the secondary schools, but students do not know it well enough and cannot get enough practice in it outside the classroom. Unfortunately, although it appears to be the least liked subject, students do not have other alternatives, but to learn to deal with it. I think one of the main reasons why students find science subjects difficult is that they lack sufficient knowledge of the English language.

## *3: Science Subjects*

### 3.1 Perception of secondary science education

As pointed out in the literature review, chapter two, there is considerable evidence that, even from quite an early age, girls and boys have different interests in different aspects of science and technology and that in general, courses tend to be geared overwhelmingly to male interests, (Whyte 1984: 2). Moreover, according to the liberal feminist model, education may create and perpetuate inequality. Therefore, this model believes that schools are partly responsible for instilling sexist attitudes into children. To have some understanding about some of these factors, students were asked to give an overview of their perceptions on the questions presented in the set of tables below.

***Table 5***

| *Were your secondary science subjects relevant to your life?* | | | *Did you like your secondary school science teaching methods?* | | *Did you find the secondary science content easy to understand?* | | *Did you find secondary science language easy to understand?* | |
|---|---|---|---|---|---|---|---|---|
| | *F* | *M* | *F* | *M* | *F* | *M* | *F* | *M* |
| *Yes* | *9*<br>*60%* | *9*<br>*52%* | *10*<br>*67%* | *10*<br>*59%* | *11*<br>*73%* | *10*<br>*59%* | *13*<br>*86%* | *13*<br>*76%* |
| *No* | *6*<br>*40%* | *6*<br>*35%* | *5*<br>*33%* | *7*<br>*41%* | *4*<br>*27%* | *7*<br>*41%* | *1*<br>*0.06%* | *4*<br>*24%* |

As can be recalled, similar questions to these were asked also to the secondary school pupils; however, the responses were slightly different. Over all, although the majority of the participants, (males and females) were positive about their secondary school science subjects, probably due their age and diverse educational perspectives, these (university students) seem to express more realistic views in their replies. However, there is some thing which is consistent with the responses of the girls, i.e. both with the secondary school pupils and with the university students, girls' responses are found to be slightly more positive than the boys' irrespective of the questions asked.

Although the majority indicated that they had no problem about their secondary schools, there were those who expressed some concerns about the lack of science laboratories. Some of their expressed concerns are included here.

> *"Our science courses were not accompanied with laboratory works. There were physics and chemistry labs, but I remember visiting them only once in my entire secondary school days".*

> *"We have been to the laboratories in total 4-5 times only in the four full years of our secondary education".*

> *"All concepts including those that need experimentation are taught theoretically. If lab experimentation were used I feel that all students would have paid attention and followed the lesson with interest".*

> *"Every school should have and use laboratories for the students to see practically what they have learned theoretically".*

One student, who thought science teachers lacked proper teaching skills, suggested that, they (teachers) ought to attend in-service training on how to teach their subjects more effectively. He wrote:

> *"Many teachers have certification to teach but unfortunately do not know how to convey the proper message to the students. The Ministry should show them the best methods to teach and convey the message to the students".*

Still others said that 8th grade physics was too complex for that level; similar responses were found also among the secondary school teachers in this study. Further more students pointed out several problems that need special attention and in summary what they have pointed out are listed in order of importance.

- *1st lack of proper laboratories*
- *2nd lack of good text books*
- *3rd poor teaching skills and*
- *4th subject complexity*

University students have better chances of working out their experiments in science laboratories than their counterparts, the secondary school pupils and probably because of that experience they were able to compare secondary school science learning and have emphasised the lack of science laboratories. Unfortunately, most Eritrean secondary schools teachers continue to lecture science subjects the same way as they would lecture history lessons because they lack appropriate laboratories.

### 3.2 Amount of time allocated to science teaching

In this section participants were asked if the time allocated to science teaching per semester was enough. Over all, they said it was sufficient but some lamented that science syllabus was too broad and impossible to cover in the amount of time allocated. Three periods of 40 minutes per week were the only allocated duration of time for teaching each science subject, therefore, some of the respondents felt that this was too short. Some participants said that it was difficult to start and finish experiments in laboratories, in a space of only forty minutes, therefore, they argued that several teachers were unable to cover the content designated for a semester.

Yet others thought the time allocated to teaching different science subjects would probably have been enough, but some teachers did not use their time effectively, therefore, they could not finish the content on time. Other students objected to some teachers' usage of class time to mark homework assignments, rather than assisting the students to overcome some of their difficulties by teaching them new concepts or re-explaining un-clear points. Still others thought time would have been enough, but 8th and 9th grade pupils spent a lot of their time learning history and geography instead of concentrating on science subjects, which were their majors. These students speculated that it would have been better to balance the time of science teaching by spreading it evenly in the four years of secondary education rather than trying to cram teaching most of it in the last two years of secondary education.

### *4. Gender and learning*

This section has four parts which are, learning styles, achievement disparity, schools discipline problems, Eritrean society's attitude, and encouragement from parents. Learning as indicated earlier in this thesis is affected by in-school and out-of-school factors, however, the radical feminist perspectives would suggest that education consists of the transmission of 'male' knowledge. This means that what is taught in school is simply an account of male experience presented as though it were everybody's experience, pretending to be value free. Moreover, classroom observations, by (Ogbay 1999: 162), revealed that teachers in Eritrean secondary schools do not interact with boys and girls in the same way. Her argument on the issue is as follows:

> *Girls are more disadvantaged than boys quantitatively as far as teachers-students and students-teachers interaction are concerned. More teacher-initiated task talk is addressed to boys than to girls. Teacher-initiated solicits are directed more to boys than to girls. Likewise, prompts, which are expected to encourage students to continue talking until they reach the right answer, are also directed more to boys.*

To find out if these were the experiences of the participants in this study, as in chapter five, they were asked to give their observation about pupils' interaction in science classes. Thus as in chapter five, these participants, too, reported that more boys than girls participated actively in class. The reasons for these differences varied; however, as some participants pointed out it was natural because there were more boys than there were girls in most classes. Nonetheless it would seem that girls participated less actively due to the societal attitude towards them. Their views are as follows:

- *Girls unlike boys are raised up feeling less confident in themselves and are encouraged less to participate in the classroom. (*girl*)*
- *We, girls do not feel confident to speak in public, because society has made us to feel that way.* (girl)
- *Because most of my friends were Bilen and Tigre, where the value for girls' higher education was low and un-motivating. Girls were made to stay at home rather than go out to attain good education. (*girl*)*

(Bilen and Trigre are two ethnic groups, which are known for keeping women in very low profile. Moreover, women play no active roles in the public life among these groups).

- *The culture influences all the activities of the female students and girls feel inferior, possibly because they are not allowed to ask questions or take any decisions in their homes.(* boy*)*

- *Boys are not shy and they are eager to learn; they know their future depends on the kind of education they obtain.* (boy)

- *The society does not encourage girls as much as it does the boys. Girls are given a lot of house work to do rather than being left free to concentrate on their academic tasks.* (boy*)*

- *Most teachers are males and male students don't worry if they make mistakes, but girls feel shy participating in class.* (boy)

- *Teachers believe that boys can contribute valuable points, but do not think that girls can give constructive ideas. Besides, some of us lack self-confidence. (*girl*)*

In summary, girls do not participate in class as much as boys do, because:

1) there are more boys than girls in class, so boys dominate the discussion,
2) girls are brought up feeling less important, so they do not feel comfortable to share their points of view, and
3) teachers value girls' contribution less than that of boys.

Observing the responses of the students, which portray rather rigid and deterministic views, I started to think that there is a need of introducing post-structuralist concepts to the nation, so we can become more flexible in our thinking and in the ways we treat boys and girls.

It was pointed out that girls do not participate actively because they are shy, have low self-esteem, feel inferior to boys, etc. Girls act that way because a virtuous Eritrean girl is expected to be humble, self-less, subservient, quiet, hardworking, etc. The list can go on. Despite these wider social expectations, a girl-pupil is expected to be as active as a boy-pupil, who outside of a class room is expected and probably trained to be strong, studious, leader, thinker, outspoken, decision maker, etc. In agreement with post-structuralist theorist (Jones 1993), I would like to suggest that it seems unfair to blame girls who find themselves in a classroom setting where they feel overwhelmed by male dominance, for appearing passive and un-interested in learning. According to this theory, what it means to be a girl is to develop feminine subjectivities in different variable settings, which might differ significantly from each other. Moreover, I think that girls would not be as shy, demonstrate low self-esteem etc. if they were to find themselves in a friendly atmosphere. I say this because of my personal experience, especially while I was in secondary school.

> *I learned in a boarding school where every activity of life is social. I used to study with my classmates and I don't remember a time when I studied alone. This is an advantage because it is a kind of sharing knowledge that is stored in different minds, (sic)* (Eritrea Profile Sept. 13, 1997).

Indeed, boys can encourage each other as well as develop the spirit of competition and the desire to learn, when they study together with their peers. Girls unlike boys, although they are by nature co-operative, they are obliged to stay home and use a good amount of their time doing non school work, which leaves them with no possibility to compare or share notes with their peers.

One of the participants argued that, girls find pleasure learning from a familiar atmosphere and from getting the attention of the teachers as well as that of their peers, but unfortunately girls are denied both of the attentions suggested. They could not get teachers' attention because classes were dominated by teachers interacting with boys and could not enjoy the support of a friendly environment of their peers while studying, because they had to stay home and study on their own. Therefore, as the situation stands, girls do not have enough chances to fulfil their needs for learning. As a consequence, they do not participate actively as are the boys in their science classes. Furthermore, according to (Swainson 1995: 19): *"Female domestic labour is a key factor that militates against girls' achievement at school".*

Evidence so far shows that even when parents are willing to educate their daughters, they still retain different attitudes towards them from their sons. For example, they are likely to want to keep a tighter control over the girls than over the boys. Besides, they may be more choosy over which school girls can attend, possibly being less willing to allow them to travel to a distant school. Above all, it is not difficult to imagine that girls will have less chances of concentrating on their learning if they stay home to study. As indicated by (Ogbay 1999: 159), girls claim that domestic work is hindering them in their studies because housework is not something they can avoid. Ogbay further points out that girls cannot sit and study when lunch or dinner is not ready for the family. Unfortunately, they do not have an alternative but to stay home and try their best to be full time house-keepers and students at the same time. Post-structuralist theory, (Jones 1993), also reflects that girls may engage several meanings or positioning simultaneously, hence they may take themselves up in contradictory positionings.

furthermore they were asked to comment on how teachers reacted to those who caused the disruption in school. Overall these students said that there were no prominent discipline problems in their schools and most of them said that teachers gave similar punishment to boys and girls who committed similar offences; however, some said that teachers did not treat boys and girls in the same way.

Those who pointed out teachers gave similar punishment to all misbehaving pupils wrote saying that teachers:

- *dismissed them from the class for a fixed period of time or sent them to the disciplinary office,*
- *made them call their parents to the school office,*
- *administered corporal punishment and/or made them to do some work on the school premises.*

Some of those who thought that teachers treated boys and girls differently, pointed out that teachers did not give any importance to girls' misbehaviour, they just ignored them, which I think is even worse than physically punishing them. Moreover, three girls and two boys wrote that teachers used harsher punishment on girls than they did on the boys. As the responses below testify:

- *When boys misbehave, teachers (are cautious as to what type of punishment to use) but they do not worry much about girls' punishment. They choose any type they see fit. After all no one really cares about them. (girl)*
- *The punishment for girls was harder, teachers gave slaps on their faces or even kicked them with their feet, which was not the case with the boys. (girl)*
- *Teachers insulted girls with words, which made them feel inferior. (girl)*
- *Teachers dealt with boys' discipline problems calmly, but dealt with girls' violently.(boy)*
- *It varies from teacher to teacher, but most of them used corporal punishment on those who are weaker than themselves. (boy)*

No wonder the weaker ones, who in most cases are the females, cause less discipline problems in school. They know that their teachers' reactions will be harder on them than on the boys. If (the physically weaker) pupils are sensible, they will behave well to avoid humiliation and/or physical punishment. Besides, Eritrea is a small nation and gossip travels fast. Therefore, people are afraid of doing anything wrong to avoid gossip about them and avoid ruining their reputation. The inference is that pupils, particularly girls, fear the risk of ruining their reputation, therefore, some may refrain from wrong doing in school or everywhere out of fear rather than out of conviction.

the society. Boys on the other hand, are encouraged to study science and technology so they can become future professionals, e.g.: scientists, archaeologists, doctors or engineers. It is, therefore, not surprising that there are not many Eritrean women scientists, professors, engineers, etc. They would have to fight against all odds to attain their goals. My interpretation is that outside-school factors are as important as in-school factors discussed above, in affecting the learners' lives.

Up to this point the discussion focused about how girls were discouraged by the society in general and by their secondary school teachers in particular, but now the discussion will take us to the parental or family lives of the learners.

### 4.5 Encouragement from parents

It is believed that all parents give some kind of encouragement to their children to succeed in their education. Therefore, students were asked to share how much encouragement they received from their parents. The question and responses follow:

***Table 7***

| ***Were you encouraged by your parents to achieve in your education?*** | | |
|---|---|---|
| | ***Female*** | ***Male*** |
| ***Yes*** | ***12 80%*** | ***16 94%*** |
| ***No*** | ***3 20%*** | ***1 0.5%*** |

Although both sexes seem to have received a lot of encouragement from their parents, when their responses were classified by the gender of the respondents, as was found in chapter five, more boys than girls were found to have received encouragement from their parents. Some of the respondents' views on how they were encouraged by their family members are listed below:

- *They encouraged me by helping in the house chores in the family, to allow me to concentrate on my studies. They did not object my going to the libraries and other places to study and they encouraged me to work hard on what I believed to be right. (girl)*
- *My parents did not give me any thing else to do at home besides doing my studies. (girl)*
- *Even though my parents had no formal education, yet they have been wonderful in giving their offspring good education and helped us in any way possible. For example, they used to wake me up in the middle of the night to study and prepared for me tea or coffee according to the needs and provided me with necessary material for learning. (girl)*

was promised luxury items such as a bicycle, special shoes etc., if he stood 'first in the class'. Boys are told that their future depends on their education, but such views are not mentioned in any of the girls' responses.

In conclusion, boys and girls were helped in very different ways. With the exception of one girl who was provided with something like coffee or tea to keep her awake in the night and another girl who was provided with some money to buy herself some books, they did not receive any special learning material or academic assistance, as were the boys. Therefore, boys' incentives were concrete but girls' incentives were mostly (verbal) moral support. Moreover, these girls are not typical, because they are more advantaged than the other participants in the study.

Over all this section confirms the hypothesis of this study, which presupposes the society at large, the parents and teachers give more encouragement to boys, rather than treating all the children equally irrespective of their sex. Unfortunately, the cycle continues because there is not enough communal or practical sensitisation to challenge and reverse the situation.

### *5. ESECE and Advice on how to study science*

As indicated both in this chapter and in the previous chapters, Eritrean students take national exams (ESECE) at the end of their $11^{th}$ grade, which is the end of their secondary education. These exams are the bottleneck for the students' success or failure. Because if they pass these exams successfully, they have chances of finally attaining some kind of professional preparation, but if they do not, then they remain with no professional preparation and no skill to join any profession, since secondary education does not equip them with any skills. Therefore, all students are concerned about these examinations and study hard to pass them, but the majority, i.e. 85-86%, usually never pass the ESECE. Based on these factors, participants in this study were asked to share their views about the national exams, i.e. *how appropriate they thought they were for the level of the Eritrean pupils.*

In response to the question, most of the participants (78%) said that the exams were appropriate for the level of the students, but the remaining (13%) thought that they were

above the candidates' level of understanding. Moreover, they pointed out that some learning material such as the textbooks and lab-equipment were not distributed evenly in all of the administrative zones, so not all students could benefit from them. In accord with the views above three students wrote the following:

- *Textbooks and other learning items are not equally distributed in all the administrative zones to all students to use, therefore, we find the national exams too difficult.*

- *It is difficult for the students to remember what they learned in $8^{th}$, $9^{th}$ or $10^{th}$ grades during the national exams.*

- *The questions presented in the national exams are more difficult than the ones given in the classes.*

Poor school quality is equated with poor academic results, with high level of repetition and drop-outs, with lower progression ratios to higher education system than is the case for better schools; (Colclough et at. 2000: 21). Based on the results' consistency and the poor performance of the majority of the pupils, it can be concluded that most Eritrean schools need to improve their quality of teaching in secondary schools.

As one of the reasons why these students participated in this study was to obtain their opinion concerning the national exams and to ask for their valuable advice on how to learn science subjects and succeed in the exams, their views are briefly reflected. All thirty-two participants have offered their advice, but in the interest of brevity, only the most relevant points are enlisted here.

- *Study hard. If you find that too difficult, leave the natural science and get into the social science.*

- *You must not panic and know that science can be mastered through hard work.*

- *The subjects become simple if you set your mind ready to learn and work hard.*

- *Attend classes regularly, participate actively and study hard by referring to other books in the libraries and by asking the teacher when in doubt.*

- *Try to read science books and science journals as much as possible. Refer to books concerning the topics you have learned in class immediately after the lessons.*

- *Study every concept, spend enough time solving the problems and work on mathematics, because it is the subject closest to science.*

- *Think critically when studying, so as to be able to solve the problem presented to you. Emphasise understanding rather than memorising.*

- *Science needs proper understanding, so try to understand it well and ask your peers or your teachers about concepts which are not clear.*

- *Science is a very interesting subject and easy to understand. If you devote enough time on it, it will turn out to be as easy as all the other subjects.*

Recommendations to those in authority follow:

- *Organise upgrading workshops for the teachers so they can teach their subjects well.*

- *Review the science curriculum and arrange the topics in sequence and order of complexity, i.e. make sure that pupils are presented with the less complicated topics followed by the more complex ones.*

I am very pleased with the contribution these students were able to make to the study. The advice they offered to secondary school pupils and the policy makers were very good. Moreover, besides confirming many of the pupils' views, they gave more reflected and novel observations, which I think will be helpful to: the secondary school pupils, school administrators and to a certain degree also to the society at large, about how to help secondary school pupils to achieve their educational goals.

## *6. Summary*

This chapter is an analysis of the university students' questionnaire responses and it discusses about the participants' family background, their secondary school experiences and their views about the ESECE (national exams). Participants in this study were 32 students from the Faculty of Education (department of secondary school teachers). The reason these were selected to participate is so that they:

- *could give more reflected and more objective answers that the secondary schools pupils probably would not,*

As with the secondary school pupils' parents, a large number of fathers had secondary education and above; however, a larger number of the mothers had little or no formal education. However, despite the unusually low maternal formal education, an overwhelming majority (more than 90%) of the university student population was found to be males.

As some subjects, for example physics was perceived to be more difficult than others, as expected, students spend more time studying these most difficult subjects. Accordingly, 53% of the participants said they spent most of their time studying

physics, 31% said they spent their time on studying biology or chemistry and 16% said they gave equal attentions to all subjects.

Over all, although the majority of the participants, (males and females) had positive views about their secondary school science subjects, probably due to their age and diverse educational perspectives, university students expressed more realistic views concerning their science subjects. Most of them said, that secondary schools need to have better learning tools, especially science laboratories.

Participants in this chapter have pointed out, that boys and girls do not participate in the same way in secondary schools for the same reasons as were pointed out in chapter five. These are:

- *Girls were made to stay at home rather than get out to attain quality education.*
- *Most teachers are males and male students don't worry if they make mistakes, but girls feel shy participating in class.*
- *Teachers believe that boys can contribute valuable points, but do not think the same way about girls.*

Concerning the different learning styles, participants were asked to share if they noted different learning styles between boys and girls and the following views were reported.

- *Girls prefer to study at home, using the access at hand but boys prefer to go out to the libraries and study with their friends.*
- *Boys concentrate on mathematical and scientific subjects, while girls emphasise on social science, such as history, English, etc.*

The reasons for achievement disparity between boys and girls were reported to be that:

- *parents disrupt girls education by marrying them off at an early age,*
- *girls are not allowed to study in quiet places, e.g. in the libraries,*
- *neither the society nor the teachers expect them to achieve good results in their studies and girls internalise these and study less.*
- *science requires a lot of time to master but girls don't have enough time to study it.*

When discipline problems arose, some teachers treated boys and girls differently in which they used harsher punishment on girls than they did on the boys. Moreover, an overwhelming majority said that the society did not treat boys and girls the same way. The findings indicate that parents encourage all their children, but parents encourage

boys and girls very differently. They give concrete help to the boys and only moral support to the girls.

### *7. Concluding remarks*

This chapter tried to find out the views of the university students about their secondary schools. The topics covered in this chapter include students' general home environment, their parental educational level and the academic help received at home, their perception of their secondary schools, the subjects taught and the difference in the educational experiences of both sexes. It also discussed their views on the national exams and gave their views on how to help pupils to achieve the goals of their education and pass their exams. The findings of this study were very similar to those of the secondary schools; however, their reports were clearer and their responses stronger. In some instances they were more reflective and appeared more realistic. Some emphasised that the society as well as the teachers discriminated against girls' higher education, but above all they gave very good recommendations and advice to the secondary school pupils on how to study and pass their national exams.

In this chapter as in the chapter before, it was found that a large majority of science teachers use a lecture method for teaching science subjects. Hence, some teachers were concerned mainly with covering content in the allocated time, so they rushed to finish it but students did not have the chance of grasping all the content.

This chapter helped us see the view of the university students and the next chapter will take us to Eritrean secondary school science teachers.

# *CHAPTER SEVEN*

## *1. ANALYSIS OF TEACHERS PERCEPTION*

### 1.1 Introduction

This chapter analyses the data of Eritrean secondary school science teachers' views collected by combining survey and interview techniques. The points discussed in this chapter include general information concerning classroom interaction, the problems encountered in the school, the current science curriculum, gender and learning and the teachers' views on why there is achievement disparity between the secondary school pupils (boys and girls).

The focus of the chapter is on teaching, learning and assessment processes of science education. Participants in this study were all science (biology, chemistry and physics) teachers present in the schools where the study took place. The number of the participants was 35 (32 males and 3 females) teachers and their teaching experience varied from 1- 35 years. The majority of these participants were young with an average of 7 years teaching experience.

As it is not possible to speak about teaching without learning, both concepts are interwoven together in this chapter and because of that many of the questions directed to the teachers were similar to those of the pupils. Further more because parents and teachers share responsibility in the education of children, some of the teachers' questions were similar to those of the parents. However, questions pertaining to pupils' performance and assessment or evaluation were especially set for the teachers. The reason why some of the questions were shared between the different groups is to ensure validity, and to be able to compare and contrast the outcomes. As in the previous chapter, both questionnaires and interviews were employed in obtaining the data for this chapter but because there was difference in the information obtained from the two approaches, the findings are presented together.

## *2. General observation*

This section discusses various points, which include; pupil's level of participation; difficult subjects; discipline problems and teachers' reactions; academic improvement;

difference between private and state schools and disparity of resources between state and private schools.

## 2.1 Pupils' level of participation

Post-structuralist theory tried to explain how institutional practices and even the individual human subjects themselves can be understood as produced through the works of a set of discourses. Discourses, as (Mauther and Hey 1997) illustrate, are ways of thinking and talking about the world, which is informed and directed by the play of power, creating and settling limits to the truth, which people live by and understand. In the light of the views above, participants in chapters five and six and now teachers here were asked to give their view on the level of participation of boys and girls. With the exception of one, who said that all pupils participated equally and another who declined to answer the question, all teachers said that more boys participated in the class. Although some of these teachers said they encouraged equal participation by both sexes, they stated that most girls failed to participate. Similar findings were reported in (Gillibrand et al. 1999: 6), who reported that many girls in the UK exhibited a great lack of confidence and a reticence to participate in class which had led subsequently to their marginalisation.

Unlike what is pointed above, the reasons for the disparity of participation among Eritrean boys and girls were reported as the following:

- *boys take more time to study their subjects and have more confidence to express their views,*
- *most girls are occupied with their respective house hold jobs; they don't take enough time to study, thus they come unprepared to class and fail to participate.*
- *girls fear making mistakes and are shy speaking up in public*
- *there are more clever boys among the group and boys have more need to learn*
- *there are fewer clever girls in class, but even fewer risk participating actively in class,*
- *even though girls may have inquiries, they feel shy asking questions*
- *some girls have little interest in learning because they have another alternative if they do not succeed in education, i.e. they can be married,*
- *girls are less in number, so they feel overpowered by the number of boys.*

These are all interesting views. What is surprising is, however, that teachers' reported about the different factors preventing girls' active participation, but did nothing to change the situation. As indicated in these responses, girls are less motivated to work hard in their schoolwork, but above all it is believed that girls do not have enough time to do their schoolwork. To find out their view concerning homework assignments and

girls' time to do their homework, participants were presented with the following, Likert type, statements and were asked to choose appropriate answers.

***Table 1***

***Below are statements about homework assignments, by ticking (✓) in the box under the appropriate number, please indicate how much you agree or disagree with each statement.***

**I = strongly agree  II = agree  III = disagree  IV = strongly disagree**

| *Statement* | *I* | *II* | *III* | *IV* |
|---|---|---|---|---|
| *1. home work is important part of school work* | *18*<br>*51.4%* | *15*<br>*42.8%* | *2*<br>*6.7%* | *-* |
| *2. parents have the duty to help their children at home* | *14*<br>*40%* | *14*<br>*40%* | *3*<br>*8.6%* | *4*<br>*11.4%* |
| *3. parents should make sure that children do their homework* | *30*<br>*85.7%* | *4*<br>*11.4%* | *-* | *1*<br>*2.9%* |
| *4. girls do not have enough time to do homework* | *1*<br>*2.9%* | *8*<br>*22.9%* | *16*<br>*45.7%* | *10*<br>*28.6%* |

Teachers' responses to the first statement were as expected; however, their responses to the second and third statements were different from what I expected to find. I thought that it was realistic to expect some parents to consistently check their children's homework assignments and possibly for some parents to be able to help their children. However, it was surprising to find that so many teachers expected parents to be responsible for their children's homework assignment, especially at the secondary school level. Teachers' dissatisfaction with parents' lack of involvement in their children's education was expressed in the interviews also. However, knowing the parental level of education of most pupils, as was indicated in chapters five and six, I would have thought that the majority of the parents could not assist them even if they wanted to do so. This is not to suggest that the entire responsibility should lie on the teachers alone, because I believe that it is important to point out that teachers and parents alike have significant responsibility to play towards motivating their children's education. As reported in (Vincent 1996), also in the UK there was a fragmentation between the views of teachers and parents in that research. However, as will be seen in chapter eight, parents' opinion in this study was more likely to reflect their awareness of the unequal power relations between them and the school authority.

In regards to the last statement in the table above, i.e. girls' time to do their homework assignment, most teachers disagreed with the sentence; which made me wonder why so many of them failed to see that girls suffer from shortage of time. My conclusion is that most of these teachers (32/35) were males, therefore, less sensitive to girls' problems,

yet I feel that a teacher need not be a female to be able to understand females pupils' problems. I guess it is like a doctor who understands the feeling of a patient without the need of being sick him/herself.

**2.2 Difficult subjects**

Teachers pointed out that Physics, Mathematics and English were the subjects found most difficult among the Eritrean youth. The reasons for the majority of the students' academic weakness are thought to be the lack of good foundation in these subjects. I agree with the teachers in this regard because if pupils do not have a good foundation in both English and Mathematics, they will find all subjects difficult. Therefore, it is no wonder that only a few of them are attaining as much as they are expected to, especially in the area of science, which is related to mathematics and English because the medium of instruction is English.

**2.3 Discipline problems and teachers' reactions**

From the interviews concerning the ethos of the school, conflicting accounts emerged from the different teachers within the same school. Some teachers said they follow the 'Golden Rules' (golden rules are regulations concerning students' discipline problems and they are included in appendix 4), but others said they easily punished them physically, which I do not really appreciate. I would prefer that teachers treat the pupils with more respect, talk to them appropriately, rather than to rush to physically hit them or scare them with the 'golden rules'. Moreover, the crimes pupils commit as indicated in the previous chapters, do not deserve so much punishment according to my judgement. To find out the teachers' views about the issues, in the questionnaires, teachers were asked: a) *Are there discipline problems in your schools? b) If your answer is 'yes', are boys or girls causing most of the discipline problems? c) How do you react to the disrupting pupils?* In the same way as was found both with the secondary school pupils and the university students' responses, teachers, too, pointed out that there were no major discipline problems in their schools; however, the few problems they encountered, were mostly caused by some boys. What is interesting in this finding is that it was not the pupils who have difficulty learning that caused the problems, but those who are disruptive by nature. Teachers pointed out that girls generally did not cause discipline problems, and if they did they were easier to handle. Teachers highlighted the reasons for the pupils' misbehaviour to be diverse in nature; however, the following points were seen as the main ones:

- *society encourages boys to express their masculinity so they try it out in the school setting*
- *some had family problems, so they displaced their frustrations in the school*
- *pupils misbehave because of their teen-age nature*
- *some pupils disrupt because they feel bored by the theoretical learning, which they could not apply in their daily lives*
- *pupils express their hopelessness, since they do not see any positive future upcoming as a consequence of their education*

Teachers' tendency to see problem pupils in terms of their family background was found also in (Wyness 1996: 54). Although teachers tended to define children who were a problem in school as products of inadequate parenting, they were mindful about attempting to solve the problems through getting involved in family matters.

In Eritrean schools, when pupils are found doing some thing wrong, they are either reprimanded or punished on the spot; therefore, to admonish those, who disturbed, teachers take different actions to handle the problems and the following practices seem to be the most common ones:

- *Some give warning at first but if they failed to obtain the desired outcome they administer corporal punishment*
- *others call on the parents to help them discipline their own children*
- *still others dismissed the transgressors from classes for a period of time but if it became beyond the teachers' control, pupils were reported to the school disciplinary committee*
- *yet others made the pupils reflect about the '30 Golden Rules'*

**2.4 Academic improvement**

What teachers think and do with respect to their teaching responsibilities is inevitably influenced by the school environment, (Wyness 1996: 20). It is reported that during the last few years school environments were more relaxed and as a consequence showed academic improvement. In the light of these views teachers were asked if they noted an improvement in their pupils' academic performance during the last 3-4 years. In an answer to the question about half (53%) of the participants said they saw an improvement but the rest were divided between those who said they did not notice any improvement and those who declined to respond. The views of those who said there was improvement are listed here below.

- *Students are better disciplined and more interested to learn*
- *Availability of textbooks and availability of more books in the libraries*
- *Better primary schools, produced better prepared secondary school pupils*
- *Pupils' English language has improved; they became more effective learners*
- *Class size had improved (until the Ethiopian government started deporting many secondary school pupils into Eritrea)*

## 2.5 Difference between private and state schools

The two private schools, which participated in this study, were in better condition compared to the state schools. These schools were better organised, they had cleaner school compounds and classrooms, good libraries, well equipped laboratories and more disciplined students. The state schools on the other hand, with the exception of one, had deteriorated buildings, non-functional laboratories, poorly equipped and poorly managed libraries. Furthermore, they had extremely crowded classes and unfortunately a couple of them had mediocre relationship between school administrators and the teaching staff. In short, it is not an exaggeration to say it was distressing to observe the poor learning/teaching situation of some of these schools. Only one of the four state schools, which participated in the study, was found to enjoy all positive factors affecting good science teaching. After having observed the differences, I concluded that it is unfair to expect all students in the nation to attain the same results at the end of their secondary education. In fact, the results of the ESECE consistently show disparity of attainment from the different schools, i.e. the better equipped school, had slightly better results than the less equipped ones.

## 2.6 Disparity of resources between state schools

Depending on the situation that one found him/her self in, it is possible to deal with several factors which can affect ones' teaching profession positively or negatively. Thus teachers in this study were asked to share the factors which supported and the factors which hindered their teaching tasks. The questions asked were as follows; *a) What factors affected your teaching positively? b) What factors affected your teaching negatively?* Participants were expected to respond to both questions; however, most teachers chose to respond either the first or the second one. Hence, it just so happened that most of the teachers in school 4 chose to respond to the first question and the rest, i.e. teachers in schools 1-3, responded to the second one.

Teachers from school 4, mentioned the following components as the positive factors which enhanced their teaching. These included:

- *lighter teaching loads*
- *availability of the teaching equipment, such as good books, properly equipped biology, chemistry, and physics laboratories and some computers with printers*
- *well behaved and interested learners*
- *appropriate class size*
- *appropriate school building (spacious classrooms, good blackboards*
- *comfortable furniture, etc.*

Besides they said they enjoyed supportive environments because there was a good relationship between the individual teachers and:

- *the school administrator*
- *the members of the same department*
- *parents' committee*
- *students*
- *twin schools in Germany and Sweden*

As indicated earlier, all the positive factors listed above were experienced only by teachers of one state school, i.e. school 4. Unfortunately, none of the items listed above were mentioned in the other state schools, i.e. schools 1-3. It was distressing to observe the deteriorating conditions of the three state schools, but it was even more distressing to read the teachers responses from these schools. Their responses indicated that they suffered from the following factors:

- *Too large class sizes, in which it was difficult to teach and assess the pupils effectively*
- *Pupils' poor English and Mathematical background*
- *Too many unmotivated learners who are crazy about grades but not interested in acquiring the knowledge*
- *Poor discipline problems in which pupils demonstrated lack of respect for teachers*
- *Poor parental involvement in their children's education*
- *Lack of teaching aids, for example textbooks, chemistry and physics laboratories to experiment the theoretical concepts in*
- *Too little co-operation and appreciation from the school administration*
- *Imposition of rules from the central office, leaving teachers with no say to amend or alter any thing*
- *The level of noise in some classrooms located next to metal and wood workshops, and near busy roads, made pupils' concentration difficult*

Reflecting on the views of the teachers, especially this phrase; "*too many learners who are crazy about grades, but not necessarily interested in acquiring the knowledge*" which was stated by some teachers in the interview, I thought such things was only a few teachers experience, including my own. Moreover, I realised that it is not only Eritrean teachers' experience as the next paragraph will indicate. Hence, it made me conclude that Eritrean teachers are not alone in observing pupils who concentrate on getting grades rather than concentrating on attaining the knowledge.

In (Ashcroft and Foreman-Peck's 1994: 27) findings, the grade-point average permeated the entire college experience for students and provided the backdrop to their studies. This perspective defined the learning situation for students, who saw grades as defining success. They found that there was a real conflict between getting the grade and really

learning. It seems important, therefore, that students are given messages that help them formulate more adequate and appropriate views of learning. '*Where this does not happen, for instance, where contradictory messages are conveyed by the informal curriculum, learning pathologies occur, (ibid.)*'

Pondering upon the contrasting situations of the different schools which participated in the study, I cannot help but wonder about the criteria for assessing all secondary school pupils' performance, as if they were exposed to similar situations. Pupils in schools 1-3, learn in very restricted conditions, but their peers in school 4 and in the two private schools have all the conveniences to make their learning more relaxed and more meaningful. I find it difficult to accept the fact that boys and girls who experience different situations are assessed with the same criteria, but it is even more difficult to accept that pupils learning in such contrasting conditions are assessed to an identical standard. My question at this point is, how can pupils be expected to obtain the same results if they are not exposed to the same learning/teaching situations?

The same concept applies to the teachers who teach in the different schools. Teachers in schools 1-3, teach an average of 31 periods per week to about 83 pupils per class and with extremely limited resources as opposed to teachers in school 4, who teach an average of 18 periods a week to about 57 pupils per class and with much better resources. As divergent as this may look, the two groups of teachers are hired by a single Ministry and are paid the same amount of money at the end of the day. These contrasts are beyond my comprehension; therefore it goes without saying that my suggestion is some thing must be done to improve the conditions of schools 1-3 and bring the different school situations closer in terms of resources and the number of hours they teach. At this point I cannot help but conclude with saying that 'all state schools are equal, but definitely some are more equal than others'.

In general all secondary school teachers pointed out that their job was too demanding and had too little rewards, because after a long year of double shift teaching, they had to follow their students for the Summer work and the Autumn crop-harvest. Besides, the double shift teaching left them very tired at the end of the day.

## *3: Current Science Curriculum*

In the UK it was found that recent curriculum innovations in science, typically include an increased emphasis on 'active' learning; (Murphy 1997: 132). Although, as it was indicated above, teachers and pupils lived different experiences, to determine the views of the Eritrean teachers concerning the current science curriculum, participants were asked several questions, one of which was; *whether the current science subjects were relevant and applicable to the pupils' daily lives*. To this question 28 teachers replied that science subjects were relevant, but the remaining 7 said they were not. Those who thought that the current science subjects were irrelevant to the pupils' daily lives, offered the following views:

- *Topics are simply copied from foreign textbooks and are presented without any alteration or adaptation to the needs of the local Eritreans.*
- *Chemistry and physics are too abstract and could not be shown to the learners effectively, due to the shortage of equipment in the science laboratories.*
- *Topics in physics are too difficult and most pupils lack good mathematical foundations, so they can not benefit from it.*

Furthermore, teachers were asked to indicate their views concerning the level of the current science curriculum. The statements and their choices are in the table below.

***Table 2***

| ***Today's science curriculum is:*** | | | |
|---|---|---|---|
| ***Above the learners' level*** | ***Below the learners' level*** | ***Appropriate for the learners' level*** | ***total*** |
| ***10 28.6%*** | ***1 2.9%*** | ***24 68.6%*** | ***35 100%*** |

Looking at their responses, it is possible to note that the majority of the teachers believed the current secondary school science curriculum to be appropriate for the level of the learners. In comparison to the students' views, teachers' responses were found to be different. Several of the participants, especially the secondary school pupils in the interviews have pointed out that the current science curriculum was to complex and beyond the pupils' level of understanding but above all they found them to be mostly irrelevant to their future careers.

### 3.1 Comparing the current and old science curriculum

To compare the current science curriculum with what was taught in the teachers' school days, participants were asked to give their views. In response to the question, the

majority, i.e. 23 in total, said science subjects in their secondary school days were less complex compared to the current sciences. Their views were:

- *Up to grade 10 they were taught general science, only in 11th and 12th grades they learned physics, biology and chemistry separately, therefore, today's science subjects are found to be detailed and more advanced.*

- *Some topics in physics, such as kinematics and mechanics, were taught in grade 11 where as now they are taught in grade 8. Besides, the 8th grade's topics are more complex than the 9th grade, therefore physics' text-book need revision.*

- *The present science curriculum is vast and more complex compared to the science of the past. Today students learn about; health education, computer science, new astronomical factors, etc.*

- *In the past the books had many experiments, charts and graphs, but the present books do not have any of these. Therefore, today's science does not encourage pupils to learn on their own.*

It should not be surprising that many teachers found the current science curriculum more complex than the science taught twenty or so years ago, since technology continues to progress. However, the question lies in whether the content of the current science curriculum is at the level of the pupils, since some concepts are reported to be beyond the comprehension of the learners. Furthermore, the lack of appropriate instruments for learning and the lack of enough individual assistance to the learners have aggravated the situation. Hence I am concerned that many of the pupils will have difficulty understanding the subjects they learned and that could be the reason why there is massive failure in the national exams.

### *4: Gender and learning*

This section has five subsections which include; teaching and learning styles; how Eritrean society treats boys and girls; how pupils are treated in the science classroom; reasons for pupils dropping out from secondary schools; and achieving girls.

In (Salisbury et at. 1999: 415), it is reported that boys are especially susceptible to the influence of their peer groups; they fear failure and the scorn of peers. Moreover, there is evidence that females have different experience of education from males and that they achieve differently. An analysis of the OFSTED inspection (1996), as indicated in

chapter two suggests that the quality of education in single-sex and mixed schools reflect well-established differences in the performance and attitudes of girls and boys. For example, in mixed schools, girls tend to under-achieve in science; they tend to receive a smaller proportion of tutor attention than males, and so end up being taught less. What is interesting is also that the schools which girls or boys attend, seem to make a difference as to their attainment. This indicates that the differences in attainment can be created, at least in part, by institutional practices and attitudes, rather than biological differences; (Ashcroft & Foreman-Peck 1994: 151).

As can be recalled, it was reported earlier in the thesis, that the radical feminist perspective, saw schooling as part of a process by which the ideas and experiences of girls are trivialised by the male members. Also according to (Solomon 1994: 135), it is identified that the masculine image of science common to all countries, is a contributory factor to gender difference in achievement. However, the cross-cultural study in gender difference in science achievement suggests that cultural factors alone cannot account for them. It is found that boys and girls have learnt to respond to gender appropriate situations because the masculine image, which dominates science, will alienate girls and discourage their engagement in it. To find out teachers' opinion on the issues, like all the participants in this research they too were asked, *if they noted achievement disparity between boys and girls in their science classes*. In response to the question, 27 of the participants said that boys performed better than girls, but the remaining 8 did not think that there was any disparity between the pupils.

Even though cultural factors alone cannot account for every thing, as will be noted from the teachers' responses, achievement disparity between Eritrean boys and girls are found to be caused by the cultures, which affect the two sexes differently.

> *Because boys are considered the future breadwinners, they are told that they do not have other options besides education. Therefore, they are encouraged to study while, girls are discouraged from studying a lot; instead they are presented with other alternatives, i.e. marriage. (t3 & t18)*
>
> *Boys take time to study and discuss their subjects with their peers; they feel free to express their views in class; while girls take responsibility for the various family needs and do all the housework. Girls duties includes cooking, washing, baby sitting, etc. all of which take energy, time and attention away from their studies. (The views of 11 teachers )*

These responses reinforce the findings discussed in chapters five and six. Although there may be very few girls who are high achievers, the majority were found to be

achieving very poorly. The reasons for such disparity were found to be caused by the environment, in which they found themselves as well as the interests of the individual learners. Moreover, as the eleven teachers have pointed out, girls are given family responsibility, which take a lot of their energy and attention away from their education.

While it is true that each individual student is different and reacts to science education differently, there is a large body of evidence in the literature, which suggests that girls, on the whole, react to some aspects of science teaching differently than boys. Girls, especially, through the formative adolescent years, show an aversion to physical science. Boys, on the other hand, seem less keen on the biological sciences. These preferences are shown up when students are given the choice of subjects for further studies; (Woolnough 1994: 19). Moreover, gender stereotyping will restrict the roles, careers and study opportunities of a significant number of people of both sexes.

Gender expectations can lead to people embarking on lifelong careers to which they are unsuited. Unfortunately, very clearly marked gender stereotypical teachers' views are expressed here in the quotation below.

> *Boys are fast learners, hard-workers, more motivated to study, they ask questions, and they relate their education to their future career. Girls on the other hand, don't pay attention to their studies, they focus on marriage and family life. (t7, t17 & t20,)*

These views are insulting to the identity of girls in which they are portrayed as inattentive to education and looking for a married life as their sole purpose in life. Observing these teachers remarks I cannot help but wonder at what these teachers' reactions to the girls in their classes would be, and I question whether they will ever treat them with any respect.

Moreover, as pointed out by (Ogbay 1999: 168), girls are not attaining as well as they should due to low participation caused by shyness and lack of interest. She further points out that teachers do not spend enough time talking to girls, who are not ready to respond because they (girls) come to class unprepared to work. Unfortunately, all the teachers in Ogbay's study agreed that girls are overworked, but they (teachers) do not suggest any alternative as how to help improve the situation.

It appears that the atmosphere is not supportive to girls in general and teachers attribute girls' poor performance to the lack of interest in education, rather than pointing out to any other problem they may be suffering from. Girls in school face impossible roles: on

the one hand, they are disapproved of for not being assertive and active participants in class, on the other hand, they are perceived to be more interested in married life. However, knowing the culture, I think that girls would be disapproved of, if they showed too much interest in the study, ignoring all the traditional practices ascribed to females. Moreover, similar views were presented also in the post-structuralist report, presented by (Kenway et al. 1994: 200). Amongst feminist teachers of that research, there was a range of ways in which teachers viewed girls. They were variously perceived as deficient, and as ambiguous heroines, as highly rational and hence in control of their 'choices'; and as irrational, governed almost entirely by their feelings and/or by the gendered discourses of their cultures and sub-cultures.

### 4.1 Teaching and learning styles

Many factors influence the individual's experience of learning. The most obvious is the student's learning styles and their goals and values. Equally important are the institutional arrangements for learning, the size of groups, bureaucratic requirements, assessment system and the opportunities for informal contact with teachers. Other factors include the institutional ethos, such as whether the institution is caring or distanced from the students, (Ashcroft & Foreman-Peck 1994, p. 15). Therefore, different students learn in different ways, i.e. some need to grasp new material through a step by step approach, others prefer a holistic approach to grasp the whole picture before analysing the parts. Furthermore students vary in their ability to process complex situations.

Research into gender difference (Solomon 1994: 137) has related the different pattern of nurturing that girls and boys receive to the different values and views of relevance that they develop. Boys and girls have a different outlook on the world; i.e. they pay attention to different phenomena and features. This study revealed that boys more than girls focused on mechanical, structural and instrumental details, which reflect their greater involvement with modelling and handling mechanical gadgets both in and out of school, while girls attended to colours, textures, smells, and data which boys typically ignored. Because of the factors indicated above, careful measures should be taken to seek and to improve the performance of all pupils but not at the expense of other pupils. For example, boys are known to benefit more from structural and rule-bound lessons (observed in the present Eritrean secondary schools) than girls, who prefer more discussion led and collaborative lessons.

Given these findings, teachers were asked if they thought that *boys and girls had different learning styles*. To this question, 10 teachers replied positively but the remaining 25 replied negatively. Those who believed that pupils have different learning styles, have offered the following arguments:

- *Boys prefer to study independently, while girls like to study in-groups. Boys concentrate on their studies, while girls are trapped by problems of the house chores. Boys are careless about their appearance, but girls spend time on make-up.(t5)*

- *Boys are co-operative, show readiness to learn, they are comparatively fast learners, are attentive in their lessons and they show interest in their learning and progress through time. (t8)*

- *Girls have less tolerance with hardship and with mathematical problems, they need to be taught slowly and very gently and they need more encouragement in learning than do boys. (t14)*

- *Most girls are interested in studying social science and they do not do well in natural science. (t17)*

- *Girls show hopelessness in that they may not continue in higher education, so they stop learning and their dresses, hair style and shoes become the centre of their attention. (t19)*

- *The attention of girls is to attract boys rather than concentrating in their education; boys, on the other hand, tend to work in-group but girls prefer to work alone. (t22)*

- *Girls feel shy and inferior recline asking questions, because of the imposition of their culture. (t32)*

A question arises here as to whether some of the respondents, for example (t5), realised that some of the sentences were contradictory. Overall observing their responses, I question how it is possible for girls to be trapped by the house chores, yet at the same time find enough time to spend on their make-up? It is a doubtful also whether t5, t8, t19 and t22 will treat their female pupils with any respect, since they demonstrated rather 'odd' views about them. Two teachers in the interview in particular pointed out that girls were expected to help their mothers, thus to work in their homes, but they as teachers expected them to do as well as the boys in their classes.

Some teachers' responses focused on the work girls had to do at home as the main factors causing their poor achievement. However, I am not convinced that those are the key factors. I prefer to think that those are only additions to the key issues, which are

the lack of motivation and interest in the subjects' learning. Boys and girls grow up observing the traditional culture that leads them to different roads, so they learn to adapt themselves to the system and focus on what they think is appropriate for their future life.

Considering that some of the teachers' responses were not related to the question they were asked, it is arguable whether they also had a full comprehension of the English language. The question asked to state if they had observed any difference in performance between boys and girls learning styles, but some of their responses focused on the girls' make-ups, their hair styles, girls' lack of tolerance to hardship, etc. Besides some of these teachers in the interview have said that girls were absent minded and sluggish rather than trying to see them objectively as genuine learners struggling to learn their subjects. I am concerned that teachers with such prejudices towards pupils may lack objectivity in the messages they convey to their students, i.e. to both boys and girls alike.

### 4.2 How Eritrean society treats boys and girls

Since this was one of the key questions I was trying to answer, it was presented to all participants in the study, hence also the teachers. The general observation is that students' learning is embedded in a set of social expectations and bureaucratic arrangements. Therefore, how students fare depends not only on factors, such as interest in the subject and personal goals for entering the university, but also how they perceive the totality of the situation; (Ashcroft & Formenan-Peck 1994). Furthermore, expectations about boys and girls, men and women, are important elements of socialisation and are reinforced primarily by parents, teachers, peer groups and media, (Whyte 1985: 26). Based on these factors, teachers were asked: *do you think that Eritrean society treats boys and girls equally?* Their responses were divided 10 against 25. The first: 10 thought that the society treated all children equally, but the remaining 25 disagreed with that view. Those who said that Eritrean society treated boys and girls equally, gave the following replies.

- *In towns, parents send all their children to school and give them all the necessary school supplies. (t3)*
- *Nowadays, both boys and girls are given equal chances to go to school but in some Moslem societies girls get less opportunities. (t6)*

- *In the highlands people perceive that both genders have equal opportunities of getting jobs if they get a good education, so they send all their children to school. (t32)*

- *The government offers free education to children of both sexes and encourages them by saying that lack of education is a serious problem; More importantly, boys are taught to develop and reconstruct their country. (t8)*

- *The Government encourages formation of women associations. (t25)*

Some of these teachers' response I find un-satisfactory since they focused on particular practices to make their points. For example, (t3) said that parents in towns gave equal chances to their children irrespective of their sex, but it would seem that this teacher does not realise that town dwellers in Eritrea are only about 20% of the total population. I wonder what he has to say about the great majority of the Eritreans who live in the rural area. Another respondent (t6) states that girls among some Moslem societies are given less opportunities of higher education than did the boys. I also question (t6) if he realises that such a point itself is evidence enough to conclude that Eritrean society does not give equal opportunities to boys and girls, since about 40% of the Eritrean population is Moslem. Moreover, (t32) maintains that the highlanders value education, but this, too, seems to forget that highlanders are only about half of Eritrea's population. My feeling is that each of these participants thinks he/she can easily generalise about Eritrean population based on his/her limited experiences.

As was indicated above, some of these teachers, e.g. (t8) & (t25) failed to respond directly to the questions they were asked. The question was about the societal treatment of boys and girls, but their arguments drifted away from the question and discussed the governments' encouraging equal participation in education and the formation of women's associations instead. There is no denial that the government encourages education for all citizens and provides useful laws, but the implementation of the law is left in the hands of the people. Moreover, I have a problem accepting the view of (t8) who seems to be saying that the country belongs solely to the boys. He wrote the following phrase: "... *more importantly boys are taught to develop and reconstruct their country*". In conclusion, I have difficulty agreeing with those who said that Eritrean society gave equal treatment to boys and girls, because none of them gave valid evidence to support their clams.

As indicated earlier, there was a difference of opinion between the teachers. Those who said that Eritrean society did not give equal treatment to boys and girls higher education, present the following arguments.

- *Boys and girls receive different treatment in which girls are discouraged from achieving in secondary education because they are given a lot of house chores to do.* (The views of 11 teachers)

- *Some parents do not encourage girls achievement for fear that highly educated girls will have lower chances of getting married. (*t22*)*

- *Some people think education for girls is a waste of investment because they feel that the girls will be married to other families. (*t4, t14 & t21*)*

- *Institutes such as secondary schools, Teacher Training and the University are all in towns and far away from the parents in the villages. Hence, parents do not trust letting their daughters to stay away from their sight to attend these schools. (*t5*)*

- *The society thinks that education has nothing to do with a woman's life. It feels that a woman's place is at home to raise children, not to sit behind school desks. Therefore parents interrupt their daughters' education at around 8$^{th}$ grade so they can get married. (*t7, t11, t13, t16, t23 & t35*)*

- *In the rural area girls are discouraged from achieving in secondary education because it is believed that it is enough for girls to know just how to read and write, since marriage is better than education. (*t28 & t34*)*

- *Some religions suggest that girls should not come out from the house, for fear that education will encourage them to think differently from the traditional ways. Besides, women are not allowed to work outside of a home without the permission of their husbands, so they do not need higher education. (*t32*)*

Even though I am aware about how some Eritrean girls are treated at home and in the schools, I cannot conceal my surprise at the responses obtained from these teachers. Some of these views are dreadful, but unfortunately I feel that they reflect the sad reality of many girls' situation in today's Eritrea. The question that comes to mind at this point is: *how can girls succeed in higher education if they grow up bombarded with such views?* Yet, despite all these, there are a few heroic females who are trying their best to fight the system but unfortunately they find too many obstacles, which prevent them from reaching very far.

### 4.3 How pupils are treated in science the classroom

Teachers can unintentionally reinforce stereotyping of school subjects by their assumption about pupils' abilities and interests, leading them to treat boys and girls differently. In (Whyte's study 1985: 21), teachers claimed that they always encouraged

girls to participate in class. But the evaluators suggested that they were perhaps unwilling to admit to possible bias in the past.

To find out the views of the participants in this study, I asked *if they treated all their pupils equally in their science classes, irrespective of the child's sex*. To this question 33 teachers responded positively, i.e. they said they gave equal opportunity to all children to ask and answer questions and called upon both sexes to do the work out on the blackboard. For example, (t34) wrote: "*During experimentation, I make sure that there is an even distribution in the groups and that girls are not marginalised*". However, although most of these teachers said they treated all pupils equally irrespective of their sex, it is difficult to trust their words alone, since their students in chapters five and six reported that many of these teachers treated boys and girls differently in the science classrooms. I thought that some of these teachers tried to tell me what they thought would make me happy to hear, so they told me that they treated boys and girls equally. In fact, some of them said that they gave special encouragement to the girls, but I do not know if to believe that because their responses contradict those of the pupils. To be honest, I have the tendency to believe the pupils' and university students' responses more, in this regard.

### 4.4 Reasons for pupils dropping out from secondary schools

Based on the causes of students' drop out or withdrawal as indicated in chapter five, teachers were presented with two questions concerning the issue and multiple answers were provided for them to choose from. The questions and answers are in the table below:

Table 3

| ***Girls drop out of science education as it gets harder because they lack*** | | | ***Boys drop out of science education as it gets harder because they lack*** | | |
|---|---|---|---|---|---|
| ***Intelligence*** | ***Motivation*** | ***Time to study*** | ***Intelligence*** | ***Motivation*** | ***Time to study*** |
| 1<br>2.9% | 20<br>57.1% | 11<br>31.4% | 1<br>2.9% | 26<br>74.3% | 5<br>14.3% |

Teachers' responses here were not too different from what was expected. Most of them said that pupils dropped out from school due to lack of motivation to achieve good results rather than due to lack of time to study. However, even though lack of time to study was not considered as the most important factor for the students drop out, nevertheless, it was clear that the girls dropping out of school for lack of time to study

were twice as many compared to the boys. Science subjects require a lot of time to master, but unfortunately some pupils, especially girls, do not take enough time to study because they feel obliged to help at home rather that study their subjects. Girls learn from an early age that their primary duty is towards their family needs rather than their education as was also reported in the study by (Ogbay 1999).

Another important reason, which was not mentioned by the teachers, is the sense of 'hopelessness' that students feel about the education system. Most students realise that completion of secondary education is almost a waste of time, since they know that only the top 10% – 15% will be able to get up to university level. Besides, they recognise that they cannot transfer much of the knowledge they acquired in secondary education to their future career. Because of that, (t3) suggests opening technical/vocations schools for all those who are interested in it.

**4.5 Achieving girls**

As will be noted from the quotations, there were some teachers who pointed out that some of their female students were achieving extraordinarily well despite the cultural stress upon them. Their views were:

> *"Girls who come from rich families and those who come from private schools seem to perform better in their schoolwork". (t2)*

> *"Boys are more motivated and devoted to their education. They do not feel shy to ask questions but girls are passive listeners, however, there are a few of them (girls), who are achieving extraordinarily well". (t6 & t34)*

I know that if females put their mind to something, they would be very good at it. For example, they can be top of a class because they can deal with more than one thing at a time, thus it was pleasing to find this pointed out by the male teachers. However, it is not always possible for girls to focus on their study when they are not encouraged enough and are given too much responsibility helping their family at home. The teachers consulted tried to associate some girls' academic achievement to economic affluence and private schools, but these did not explain how some girls were doing extraordinarily well despite all the factors discussed regarding girls' daily lives. Nevertheless, it is important to note that at least they recognised the effects of good schools and the families' economical level, as important factors for the pupils' achievement and I agree that they play a very important role in affecting pupils' learning.

It is possible to reach the conclusion that girls from economically affluent families and those who attended private schools were motivated to perform better than their peers from different backgrounds. This can be explained as follows: if girls' families were rich then they would have domestics to do their jobs for them so they (girls) could spend more time on their studies. Besides, rich families could afford to allow private tutors to help them with the difficult subjects. Girls who attended private schools, as was pointed out in chapter two, possibly received special tutorial attention from their teachers in school and as a consequence they attained better results. In conclusion these girls were motivated to achieve good standard and they did, but if they were deprived of motivation and time to study, they would continue to attain the results that they are attaining at present.

### *5: Academic Assessment*

It is generally maintained that both boys and girls benefited from the more varied teaching, learning and assessment styles brought about by different initiatives. Although it could be argued that what girls ought to achieve academically should not be defined in terms of what boys happen to be achieving, since they are not exposed to the same experiences, inequalities in performance between boys and girls are reported in all the national exam results. Moreover, although there is a slight difference of performance between schools, which have better teaching resources, these inequalities are not confined to particular schools, but occur throughout the system.

In the chapter on literature review, the importance and effects of a person's self-conception for failing or being successful were pointed out; (Howe 1999: 121). This means experience of success or failing contribute to the person's assessment of his/her own ability and to expectancies concerning future success or failure. Many studies have shown that, when measured by examination results alone, the overall level of performance of a girl in science is significantly lower than that of boys. Several suggestions have been put forward to account for such differences. These include patterns of socialisation, expectations of schools, individual teachers and the pupils' own motivation.

Students' assessment in science is a necessary and potentially beneficial aspect of science teaching. It provides feedback to teachers, students and parents concerning students' achievement. However, the danger with assessment is that only certain things are assessable and reported. Concerning this issues, (Woolnough 1994, p. 19) writes:

> *"We can assess a students' knowledge of science and its application to certain types of problems, but we cannot assess students' commitment to or enjoyment of science".*

Assessment is a key element in effective management of learning. The usual methods of students' assessment in Eritrean secondary schools are written exams, which are mostly multiple choice in nature; however, these methods may some times include sections for the students to write short sentences or fill in blank spaces to complete sentences. These assessments take place in a classroom setting and despite the good intention and the vigilance of the teachers, because pupils seating arrangement are so close to each other, weaker pupils can easily copy from the better ones. Therefore, class tests no matter how well they are set and no matter how thoroughly they are marked, cannot be the proper measurement of the students' ability (this is partly why school grade reports were not included as instruments in this study). Probably due to the factor indicated above, many pupils who seem to be attaining acceptable school grades, obtain very low grades in the national standard exams, which are supervised better than the school exams.

Furthermore, large classes are often associated with pupils with a wide ability range. In large classes, the main task of a teacher is to deal with the bright and the less bright learners; however, many teachers do not take this issue seriously, as every pupil is treated with the same task as the other. Attempts are made to assess pupils differently from the usual methods indicated above, (e.g. individual or group project works). But as (t1, t16 & t23) point out proper assessment in large classes is almost impossible. Similar views were presented also by t4 whose points are in the quotation here below:

> *"Assessment methods need reconsideration. As things stand now, they encourage laziness in the students. Therefore it is difficult to assess them according to the criteria set for us. Because class sizes are too large, teachers can't control project-work, homework and/or class-works. As a consequence, many pupils copy from each other and pass the classroom exams, but these students later fail when they sit for the national exams".(t4)*

All learners should be encouraged to become increasingly self-directive. Pedagogically oriented teachers should tend to be more authoritative, formal and develop a

competitive spirit. Besides revision and updating of some important elements in the methods of teaching and evaluation, some teachers suggested that different methods must be used in order to motivate qualitative learning. For example (t22) reflects that:

> *"Students should be given essay type questions to motivate them to read further and encourage them to develop their language skills. Moreover, there should be more scholarship awards to promote and motivate teachers". (t22)*

Nevertheless, in his discussions on the current teaching methods, the curriculum and the work-ethic, t4 again offers the following views:

> *"We can't claim that we are teaching properly. We have too many shifts and class-sizes are too large, so we can only give seminars, not teach the proper ways. The curriculum is not finding good ground to be tested, since there are no books or other teaching aids in our schools. Teachers must be allowed to sit and discuss their problems with the authority, as things stand, schools are run in a militaristic way. Orders are passed from the authority and whether they are appropriate or not they are made to be implemented without question". (t4)*

It is unfortunate that teachers felt dictated by different rules and regulation irrespective of their outcome, yet it was crucial that several of the teachers expressed similar opinions also in the interviews.

### *6. Teachers' additional comments*

In the last section teachers were asked to add any further comment they wished to make and some of them did. Even though it was good to obtain so many positive views from the teachers, as the quotations below will indicate, it is significant to note that some teachers, like many members of the society, portrayed on anti-girls attitude.

> *"Even though girls have more responsibilities at home, if they are interested in learning they can still work around their time and achieve as well as the boys in their science education". (t3),*

> *"The number of girls decrease in secondary schools because they have less tolerance to problems and drop out of schools. Moreover, girls show weakness in science because they are entering into beauty competition and attention to marriage, rather than education. They become victims of aimless boys." (t14)*

> *"Girls should be allowed to study in an all girls' school and they should be exempted from works that take them away from their parents, even if that is only for single night" (t17).*

In his argument, (t3) says that lack of time can't be used as a justification for girls' academic weakness and I agree with him to a degree, that the lack of time to study

cannot be the only factor for their lack of achievement. However, what (t3) seems not to understand is that girls suffer from the lack of motivation and encouragement from the society to succeed. The same way as (t3), some teachers in the interviews have seen girls as being passive and less dominant in relation to boys. They were reported as being attracted to boys and thereby distracted by them. A similar finding was suggested also by, (Watson 1997: 378).

Respondent (t14) is unsure of what position to take, since he conveys mixed messages. It seems that he wants to be sympathetic to girls, when he says that they are "*victims of aimless boys*", yet he appears judgmental in his view because he portrays girls as being *less able to tolerate school problems.* On the other hand, (t17) is not in favour of mixing girls with boys in the same school, nor is he in favour of letting girls out of their house, even for a very short time. He suggests that girls receive education in (all girls') single sex-schools but also observes that they should not stay away from the sight of their parents. Some of (t17's) views would have probably been useful, but unfortunately there are only a handful of girls schools, which are only open to Moslem girls. Therefore, this is not an option for the majority of girls in the present day Eritrea. However, it would have been good to have the possibilities of opening some single sex schools for those who wanted it.

Arguments up to this point have been centred on pupils' poor performance irrespective of the parental background but (t21) suggests a novel and very important one. He writes:

> *"No matter what the sex of the child is, parental educational level, the religion of the parent and the economic back ground greatly determines the motivation of the child to either achieve in school or not. The society as well as students must be convinced of the need and value for education before they are put into that road to walk." (t21)*

I agree with the views of t21. These views are valid and very significant and I wish that they were implemented.

According to respondent (t2), unless something is done to improve manpower, education is going to be impaired. He argue men that the number of students is increasing but the number of teachers continues to remain pretty much the same. However, as indicated earlier in this chapter and in chapter five, most Eritrean teachers teach double shifts and, unfortunately, as will be noted from the quotations below, teachers' energy level decreases with every hour that passes. As a consequence, the

students who are taught in the afternoon hours get less qualitative and quantitative teaching than the morning shift students.

> *"There is a difference between the morning and afternoon shifts in the students due to the teacher's mood of teaching. Teachers in the morning are fresh and have more energy to teach well, but in the afternoons they feel drained and loose the energy to do as good jobs as in the mornings. Therefore, if the nation is to get better results, it must introduce single shift system to allow teachers to have more time to prepare the lessons well and give better services to the students". (t33)*

Likewise, (t4, t8, t23 & t24), emphasise that, if science education it to improve, the present curriculum must be revised and in the process, regional administrators, teachers, parents, and adult students must have a say as to how it could be set up. Furthermore, they suggested having an authority, which must remain in constant communication with all the groups and report the progress to those who are concerned. I feel these are very important points that need consideration. Because, if the students and the society at large is to benefit from the education of its children, the needs and wishes of the people must be considered in the formation of the curriculum.

At present there are no textbooks on the market for the pupils to buy; hence, students cannot learn properly without these valuable tools. Therefore (t31) argues that all students should be provided with textbooks, so teachers can spend more time teaching rather than writing notes on the blackboard for the students to copy from. I agree with (t31), because it is extremely difficult to learn properly without textbooks.

Besides restructuring the teaching and assessment methods, other teachers suggested provision of proper tools for teaching science subjects effectively. Accordingly these teachers say:

> *The most important part in teaching science is doing experimentation but because we lack most of the essential apparatus and chemicals, we do not make good use of the science laboratories. This makes it difficult for the learners to understand without seeing what is being taught, therefore, there is urgent need of supplies of learning items such as text books, reference books and well equipped science laboratories. (t11 & t30)*

Moreover, (t3) feels that too much attention is given to extracurricular activities in and out of schools and suggests conducting a research to find out why pupils are not studying hard to pass their exams. He, (t3), also suggests that the promotion policy should be reviewed as too many students who are not ready for the next (higher) classes are being promoted easily.

As was pointed out in the interview with the teachers, one of the most recognised difficulties is the increased pressure on teaching staff. Teaching in present day Eritrea is not a lucrative profession. Most teachers feel undervalued and unmotivated. Many come to teaching as a second or third choice-career and many aim to quit as soon as opportunity avails itself, but unfortunately for the majority there are not many possibilities out there to choose from.

Some teachers feel that they are not given chances to offer their opinions on the setting and revising of the curriculum they use everyday. Teachers are of the opinion that the Ministry of Education should involve them and encourage constructive criticism from the local people and consider implementing some of the peoples' views. Furthermore, they suggest that teachers should be rewarded and motivated to stay in the profession. The suggested rewards include having a decent salary to be able to build their own homes, having the possibility of raising their children reasonably well, to be able to afford to wear better clothes, etc. but with the salary they earn, they said that they can hardly make both ends meet.

Moreover, science teachers have always been in short supply. The pupil-teacher ratio is now very high. One of the major effects on classroom teachers has been to oblige them to teach up to seven classes, instead of three or four, due to the extension of the curriculum. The large classes and the limited teaching/learning resources have inevitably added to poor motivation in the learners as well as in the teachers.

## *7. Summary*

This chapter is the analysis of the views of secondary school science teachers and it discusses points such as, teaching/learning of science subjects, gender and learning and pupils' assessment processes. Participants in this study were all science (biology, chemistry and physics) teachers present in the schools where the study took place. The number of the participants were 35 (32 males and 3 females) teachers and their teaching experience varied from 1- 35 years. As teaching and learning are two sides of the same medal, it was not possible to speak of one without speaking of another, thus the two concepts were interwoven in this chapter.

Unlike the majority of the pupils and the university students who said the current science curriculum was not very relevant to the pupils' daily lives, the majority of the teachers said was relevant and applicable. Furthermore, most teachers said science learning in their secondary school days was less complex in comparison to the present time.

Research has indicated that girls especially through the formative adolescent years, show an aversion to physical science. For example, it was pointed out that girls tend to underachieve in science at that stage. In the light of that, like all the participants in this study, teachers were asked *if there was achievement disparity between their pupils (boys and girls) in their science classes* for which 27 responded saying that boys performed better than girls. The reasons for the disparity in achievement were not very different form those of the pupils and the university students, who said that girls were not motivated enough to achieve as well as boys.

The general feeling is that Eritrean society does not give the same treatment to its boys and girls, so as a consequence, boys and girls attained different results in secondary school and above. In the light of that, participants were asked to give their views on this issue. Here teachers gave different views, in which some thought that society treated its youth equally irrespective of their sex, but others disagreed with that view. However, to the question *whether teachers treated their pupils in class the same way irrespective of the sex of the learners*, not surprisingly almost all of them (33) said they treated them equally and some said they tried to help the girls more because they thought that they needed more support.

There was a remarkable difference of allocation of teaching resources and in the number of teaching hours between the schools where this research took place. Unfortunately, these factors were reflected in the morale of the teachers and the students in the different schools, but above all the results could be observed also in the attainment of the pupils from the different schools.

## *8. Concluding remarks*

This chapter focused on the teachers' views and the points discussed were about the teachers' activities in the classroom and their assessment of the school programmes. As pointed out, several of the questions were shared with the pupils and the university students, and it was found that most teachers' views were not very different from those of the pupils. However, there were some different views between pupils and teachers on the issue of equal treatment of boys and girls in science classes and how teachers approached the pupils, who were causing discipline problems. Teachers said they treated pupils equally irrespective of their sex, but some students disagreed with some of these views.

This chapter consulted teachers' views and we will proceed to see parents' views in the next chapter.

# *CHAPTER EIGHT*

## *ANALYSIS OF PARENTS PERCEPTION*

### 1.1 Introduction

The data in this chapter is gathered from Eritrean parents, whose children were in secondary schools. The parents who participated in the study were 41 in total (12 females and 29 males. Of these, 30 (7 females and 23 males) had a level of education which was $12^{th}$ grade or above. The level of formal education of the remaining 11 (5 females and 6 males) was between elementary to $8^{th}$ grade. The former group was included because of the level of their education and the latter because they were influential and active community members in the schools where this study took place.

Parents are the most important educators in any person's life, yet they get most of the blame when things go wrong and the least support and training to ensure that all children get the best possible start in life; (Alexander 1996). Therefore, schools alone cannot educate children or solve their social problems. In this respect, the family remains the main unit of the children's source of protection, nourishment, belonging and education. It is precisely due to this fact that it was decided to seek parents' insight into the object of this study. What follows reflects the views of the parents and hence their contribution.

The data for this chapter was obtained by means of questionnaires and interviews and since there was no major difference in the findings obtained from the two types of approaches, they were merged and presented together as a package. Questionnaires were administered to the former group (to 30 parents) and the interviews to the latter (to 11 parents), thus those parents who responded to the questionnaires were different from those who took part in the interviews. The inquiry both in the questionnaires and interviews was similar in content, but the questionnaires contained a couple of points pertaining to secondary science education in which participants' were asked to compare and contrast with the science of their school days.

Questionnaires and interviews were expected to be replied to by individual persons, but two of the interview sessions were shared with some unexpected, but welcome guests who happened to join in the discussion. With the exception of the two interviews, which I will explain, all the others were conducted on a one to one basis. In one instance, a

woman who agreed for the interview was met in her office, which was shared with a co-worker. As there was no other convenient place, the interview took place in her office with the office-mate present. This interview started with one interviewee, but as it progressed, the other woman spontaneously joined in responding to the questions and so the data obtained became from two women instead of from just the one, as originally intended.

In another instance, an appointment was made to interview a gentleman, but when the moment arrived he decided that the interview should take place in his shop with at least three other persons present. I felt uncomfortable interviewing him in public; however, since that was his choice I did not object. When the interview started every one minded his/her job, but like in the previous one, as the discussion progressed the co-workers started to join in one by one. Thus although most of the responses were from the main interviewee, some views were shared with his co-workers. This particular interview was unusual and a bit disrupted because customers came into the shop while the interview was in progress and interrupted us a couple of times.

### *2. Parental involvement*

Parental involvement is concerned with parents' engagement in learning activities, mostly, although not exclusively, in the home, (Coleman 1998: 2). However, involvement is not limited to the actual learning task, it includes the home curriculum, i.e. the patterns of habit formation and attitude development that prepares a child for academic learning. Parents are responsible for children's early socialisation, for the laying down of the mental and emotional framework which can be built upon by school and community. In this sense, one can safely argue that parents are the children's first educators. The school is another place where children's education is somewhat moulded. But since both the family and the school normally exist within a local community, the education and socialisation of most young people take place within this threefold context, i.e. home, school and community.

Although home is clearly a critical influence in determining how well a child will perform in school, the characteristics of the early years of primary school which are so conducive as to achieve parental involvement, are long gone by the time a child enters secondary school: (Beresford and Hardie 1996). At this level, the syllabus is increasingly complex for parents to understand and most children at that stage begin to

demand more independence from their parents. Given these and the fact that there are more teachers for parents to relate to, parents of secondary school pupils may have different perceptions. Furthermore, as indicated in chapter two (in the post-structuralist theory), pupils' lives are influenced by the in-school and out-of-school factors. The in school factors are associated with the school's cultures and subcultures; those out of school will include the discourse of family and the local community's cultures.

To obtain a general over-view of the parents about their secondary school age children and their schools, they were asked to state the type of problems they encountered in sending their children to secondary schools. Most parents had not reported problems, however, a couple of mothers who were employed outside of the home expressed concern about their secondary school children, because they could not give them; a) academic support and b) were very worried about their daughters being overburdening with family responsibilities. Girls usually share the domestic responsibility with their mothers and girls, whose mothers are employed, take more responsibility than those whose mothers are not. Moreover, domestic chores in Eritrea take a lot more time and energy to execute than most can imagine, since everything is done manually. Besides, there are not many grocery shops, which sell all food items in one place. Therefore, women, whose duty is to provide their families with ready made meals, spend a lot of their time searching for all the required food items from the different markets and get into the tedious process of preparing it. In addition, in some places women carry water from distant places, prepare live fire for cooking, do the laundry by hand, sweep and tidy the house and so on and so forth. Moreover, since most families have no refrigerators to store cooked food, the women feel obliged to prepare freshly cooked meals at least twice a day, which takes a lot of their precious time and energy.

### 2.1 Private tutors

Parents and teachers both have educational influences, each with their own special contributions to make. Moreover, there is a clear argument, supported by extensive and convincing evidence that the most effective education occurs when families and schools work together as part of a shared enterprise. According to Block 2 Family and school (1997: 28), families are and always have been, the biggest influences upon the attitude, behaviour and academic performance of children and young people. Much of what children will eventually know and be able to do is shaped in the home. In the light of these views, parents were asked: *Do you personally help your children or provide them with private tutors?*

To this question 83% of the respondents said they helped their children on regular bases. Of these 20% said they did it on a daily basis, 50% said they helped them 2-3 times a week and the rest helped them only when their children asked them to. The remaining 17% of the participants said they understood their children's needs for academic assistance but regretted for not being able to assist themselves or pay tutors to do the job for them.

As indicated above, 83% of the respondents, whose education was secondary and above either helped their children themselves or paid someone to tutor their children. But unfortunately, the majority of the parents whose level of education is lower than secondary level would have difficulty understanding the gravity of the problem their children may be facing and even if they did understand it, they would have insufficient money to pay for the tutors. Therefore, this explains why the great majority of the students in the University of Asmara are children of highly educated and/or children of the well off parents.

**2.2 Teacher' work performance evaluated**

Teachers and parents are partners in the education of children. Real partnership between parents and schools depends on mutual respect between partners; Block 2 Family and school (1997: 15). This means that each partner needs to recognise what the other brings to the collaboration. Partnership is instrumental in making the school a success. If the schools do not actively acknowledge and encourage a strong partnership with parents, children's education will be limited.

To find out the parents' views about the teachers of their children, they were asked the following question: *some parents complained that teachers were failing to perform their duties, are you of the same opinion?* There was divided opinion in this regard in which 43%, agreed, another 43% disagreed and the remaining 14% refrained from responding. The group, which disagreed with the question, expressed great admiration and appreciation for the sacrifice teachers were making to help their children. Their argument was that teachers were doing their best to serve the needs of their pupils and worked under too much pressure and restrictions. But above all they pointed out that teachers were teaching with very large classes, very limited resources and in double shifts. Moreover, they said that teachers are not to be blamed for pupils' weaknesses, since some pupils are irresponsible and often disrupt their classes. To avoid some of

these problems, they said that parents should play more active roles in re-directing their children and helping to solve some of the in-school problems. However, these respondents also have raised concern about some limitations, which were shared by the second group of respondents. The issues raised will be discussed in the paragraphs to follow.

Some of these parents observed that some science teachers were less prepared to teach, because they lacked sufficient experience, they lacked ability to express their ideas clearly and had a language barrier in communicating the messages to the pupils. These parents also argued that such teachers needed more and better teaching resources and more training on how to teach the different science subjects. Teachers' weaknesses, as parents pointed out, were reflected on the pupils, who had great difficulty expressing in the simplest form of English. However, even though parents have noted all the problems listed above, they did not expect teachers to give individual attention to all pupils because they realised the number of pupils was too great. As to interpretation of the pupils' poor English language, as was indicated in the previous chapter, the blame cannot be put on the teachers alone, because teachers cannot be expected to give more services than they are already giving.

Yet other parents said that they were dissatisfied with the type of education their children were receiving, in which they argued that pupils were not grasping the concepts they were learning, because teachers were not able to convey the messages accordingly and were not offering pupils enough support and encouragement. They pointed out also that schools did not offer sufficient resources, such as textbooks, reference books, and properly equipped science laboratories. They further expressed concern that books were unavailable in towns to buy. These parents felt that schools were not motivating pupils to study well and pass their exams, as a consequence, only 10-15% of the candidates have passed the national exams since independence, (1991). In the end, they concluded by saying that subjects in general, and science in particular, were too complex and abstract for the pupils' to understand and too difficult to implement in their daily lives.

### *3. Past and present science subjects compared*

The participants who filled the questionnaires were asked to give their views concerning the current provision of science in comparison to their school days. In response to the questions, in a similar way as was reported in the previous chapter, 53% of them said

that the current science was more complex compared to their youth days. They thought science subjects in their school days had been made to fit the potential and the level of the learners but today, they said, "pupils are made to fit the curriculum". They also pointed out that today's science, especially some concepts in physics and chemistry were more complex and above the level of the children's understanding. They argued that what would have been taught to $10^{th}$ - $11^{th}$ grades in their school days is now being taught to $8^{th}$ graders, before these pupils are introduced to basic mathematical equations. Therefore, they concluded that children find science subjects too difficult to understand without the help of some adults at home. Moreover, my view is that most parents are incapable of helping their children at home, because they lack the know-how and others lack time because they work too long hours outside of their homes.

Likewise, in the participants' school days, class sizes were much smaller than they are today and one teacher taught several subjects, which made it possible for him/her to know the pupils personally and identify their weaknesses. On the contrary today it is almost impossible to do any of that, because teachers are subject specialists and teach one subject to several large classes, making it impossible for them to detect the weaknesses of the individual pupils and help them. My observation is that teachers do not even know the names of most of their students, let alone give them individual attention, because pupils are too many for the teachers to remember each and every one by name.

### *4. Society's attitude and its effect on achievement*

The influences which shape students' judgements about the school, begin with a home variable, i.e. it must start with a reconsideration of school effects upon the home, and home effects upon the school, and treat these interactive effects as essential, alterable variables: Coleman (1998). Hence in an attempt to understand the parents' view about the society's attitude, they were asked to share their views on *how they thought that Eritrean society treated boys and girls*. To this question, 46% of the respondents asserted that society encouraged boys and girls equally, while an equal number of parents (46%), revealed that society discouraged females, but the rest did not reply. Participants' explanations as to how they view the different treatments, are presented in the subsequent sections.

Those who said society encouraged both males and females equally made the following comments:

- *Although this may still be in its first stages, many families are trying to encourage their sons as well as their daughters to obtain higher education.*
- *In towns most people understand equality between males and females, thus give them equal chances to attend schools.*
- *Almost all families send their children to school, believing that their future will depend on their education.*
- *There is a quota for allowing girls to enter the university, which is encouraging girls' participation in higher education.*
- *The mass media is sensitising the society by pointing out that, males and females are equal; therefore, have equal rights to education.*
- *Society now understands the value of education, so it provides all children with the necessary equipment and advises them to work hard towards their academic achievement.*
- *Jobs that were once restricted to males, are now made available to females as well.*

These were the views of those who said that society encouraged them equally but the views of those who said that society treated them differently are presented here below.

Participants, who thought that the Eritrean society discouraged girls, said that parents do not allow their girls to continue in secondary education. This, they believed, was for fear that education could expose their daughters to think differently, thus leaving them to select a different life style and marry outside the traditional practices. Therefore, their expression was that society thought it was enough for girls to know just only to read and write. Moreover, some expressed the views that society thinks a woman's place to be at home with the children, not in schools behind desks. Their inference was that some parents have not shown much concern over their girls' lack of achievement, as some of the following remarks may indicate:

- *Maths and physics are not considered girls' subjects,*
- *In the villages, the people don't accept equality between boys and girls,*
- *The society does not encourage girls to achieve in education, on the contrary, it makes them do non-school related works, hence making them spend a lot of time doing the house chores,*
- *Male children are not made to help in the domestic chores,*
- *Some discourage girls with the language they use and some parents don't even send their daughters to secondary schools,*
- *Bullying, which is practised by some males, predisposes females to feel inferior,*
- *It is a taboo for girls to speak about reproduction in front of parents and/or teachers, thus they may not discuss some science topics in public,*
- *Some families marry their daughters off at an early age (16-17 years old),*
- *If a girl delays arriving on schedule either to school or home, she is looked at with suspicion,*
- *Parents let their sons be free but they put heavy burdens on their daughters,*
- *At times there is not enough room to accommodate all children in the secondary schools and some parents are given chances to have only one child in a school.*

*Hence they are found to choose to send a son to school even if the daughter is senior to him.*

To find out the parents' interpretation of the society's as well as teachers' attitudes towards girls' higher education, participants who filled the questionnaires, were presented with a list of questions pertaining to the issue and were asked to reply by ticking yes or no. In summary, the questions asked and their responses are presented in the tables below.

**Table 1 a & b**

| | *Does **Eritrean society** encourage girls' higher education?* | | *Does the **society** convey a stereotypical attitude to girls' science education?* | | *Do secondary **schools** (where your children go) discriminate against girls?* | |
|---|---|---|---|---|---|---|
| | ***mother*** | ***father*** | ***Mother*** | ***father*** | ***mother*** | ***father*** |
| ***Yes*** | *3*<br>*43%* | *12*<br>*60%* | *4*<br>*57%* | *15*<br>*65%* | *2*<br>*29%* | *0%* |
| ***No*** | *4*<br>*57%* | *8*<br>*40%* | *3*<br>*43%* | *8*<br>*35%* | *5*<br>*71%* | *23*<br>*100%* |

| | *Do you think **teachers** are less tolerant to girls' misbehaviour?* | | *Do **teachers** readily accept girls' weakness in science subjects?* | | *Do **teachers** involuntarily convey stereotypical attitudes to girls in school?* | |
|---|---|---|---|---|---|---|
| | ***mother*** | ***father*** | ***mother*** | ***father*** | ***mother*** | ***father*** |
| ***Yes*** | *4*<br>*57%* | *4*<br>*17%* | *4*<br>*57%* | *9*<br>*39%* | *4*<br>*57%* | *8*<br>*44%* |
| ***No*** | *3*<br>*43%* | *19*<br>*83%* | *3*<br>*43%* | *14*<br>*60%* | *3*<br>*43%* | *10*<br>*55%* |

The figures indicate that there is a slight difference of opinion between fathers and mothers. In general, more mothers than fathers have shown understanding of the situations of their daughters. Moreover, in the interviews, with the exception of one father, I felt that some fathers were less sensitive to their daughter's problems. The mothers, on the other hand, possibly because daughters shared more of their problems with them, were found to be more sensitive and understanding of the girls' situations.

### 4.1 Boys' and girls' academic attainment compared

The trends for the Eritrean secondary school pupils is that girls attained less grades than boys in all subjects, but especially in science. Hence, to get the opinion of these parents about their own children's attainment they were asked: do your children (boys and girls) get the same grades in science? To this question parents gave different replies, in which, 30% responded saying that their sons did attain better grades, 17% said their daughters did attain better grades, despite the massive work they were given to do at home. But the rest (53%) said their children's grades were similar. However, despite

their mixed responses concerning the children's grades, 33% of candidates said that boys had more time to study, while girls spend a good amount of their time doing house chores.

What never ceases to amaze me is that parents and teachers alike said that girls had less time than boys to study at home, because girls were engaged at home with doing the house chores but they don't see any problem with that. Teachers, parents and the girls them selves accept it as the norms, thereby, do nothing to change the situation.

Moreover, there were two parents who said boys achieved better, because they were more intelligent than were girls. Yet another two of the parents argued that their children would have been able to obtain better grades; however, they pointed out that pupils' attention was deviated because they were made to attend too many extra-curricular activities. The extracurricular activities they referred to were the summer work programmes, indicated in chapter five and the Autumn crop-harvest, introduced in the last 3-4 years in order to help the families of those who were in the army. In reference to the pupils' work programme indicated above, one of these parents said that too much extra curricular activities (farm work) was imposed on the pupils. Moreover, even though, some families are not in favour of sending their children to the work indicated above, they have no choice but to let them go.

Some parents insinuated that lack of motivation for achievement is responsible for their children's academic weakness; therefore, they suggested that children must be motivated if they are to achieve better results. Yet others said that their daughters did not attain as good grades as their sons and suggested that girls were usually not allowed to go to the libraries to study, and were given too much work at home. As was pointed out over and over again, post-structuralist theory, (Jones 1993) suggested that girls can no longer be seen as simply socialised in their appropriate gender roles. However, observing the responses of all the participants in this study, Eritrean society is still far from being affected by such theory and expects girls to simply live by the traditional practices and, unfortunately, the girls themselves too, conform to it with out much resistance.

Two parents in the interview, reported that their daughters were not attaining good grades in secondary schools, but maintained that house chores couldn't have been the

excuse for their academic weaknesses. They agreed to my question when I asked them: do you mean that *"those who are good at some thing are good at everything and those who are weak in something are weak in everything"?*

Even though as a dutiful researcher, I have tired to conceal my feelings, I was not very impressed by three of the interviewed fathers, who showed too little sensitivity towards their daughters. Some of their responses left me stunned, because I was unprepared to attain such responses from parents. These three interviewees said their daughters helped their mothers at home because they felt that it was their duty to do so, yet their point of view was that they were not studying hard because they were not clever enough. These fathers blamed their daughters for not studying enough, ignoring that probably they themselves were responsible for a lot of it. I know for a fact that most fathers would not move a finger to help take care of the house needs, e.g. to cook, clean, wash, set a table, clear a table, do the laundry, because they expect all these activities to be girls'/women's duties. One of these fathers said that boys definitely were more intelligent than were girls, and as a consequence he expected them to obtain better grades than the girls. Furthermore, this father said that he did not expect his sons to help in the house, instead he expected them to study hard and attain good grades. The other two, although they said they did not believe in natural intellectual difference between males and females, they labelled their daughters, calling them 'immature'. They said that besides helping the mothers, their daughters spend the rest of their time concentrating on their bodily-image, i.e. trying to look beautiful, rather than trying to study their subjects. These parents also maintained that girls go to school but stay inattentive in class, hence, they attained lower grades than boys.

It was indicated that in this study, mothers were found to be more understanding of the problems of their daughters than were some of the fathers. However, one father showed even more care and understanding than some mothers, in which he shared a more balanced attitude towards the education of his children irrespective of their sex. This father said that he always spoke to them (to both boys and girls alike) about the value and the advantage of education. He said that he even tried to bribe them by buying them useful gifts to encourage them to achieve higher grades in their education.

### 4.2 Boys' and girls' intellectual ability evaluated

In the literature review about the UK, it was pointed out that parents and teachers had different expectations of their daughters and/or sons, (Murphy 1997), (Harding 1992), and (Riddell 1992). To find out the views and expectations about their children, parents in this study were asked a question: *do you think males and females have similar intellectual ability?* To this question most parents, (78%) reported that children have similar natural intellectual ability and added that children may differ because of their individual talents, but not because of their sex. Furthermore, they remarked that the traditional practices and beliefs depend on the experience of the individual situation, and affect the child's achievement positively or negatively. Therefore, they concluded by saying that the differences of achievement between males and females in Eritrea are caused by the effects of the society's differential treatment to the children, rather than the individual child's sex. I like this view, because it reflects my own views as well.

To motivate all children to attain better grades, parents said that children must be helped/encouraged by adults, i.e. parent and teachers alike. I was happy to obtain such responses from the parents, yet I felt that they were doing too little of the good practice they have suggested in their responses. Because if they were to start implementing some of what they have suggested, we would have better results in all pupils, both male and females alike.

### 4.3 Boys and girls helping the family

As indicated earlier in the thesis, girls spend several hours helping at home but to obtain the responses of the parents in the regard to the issue, they were asked to indicate *if their children (boys and girls) helped at home and, if so, about how many hours per week.* They responded saying that 63% girls as opposed to only 13% boys helped at home on a regular basis, but did not specify the amount of time. It was interesting to note the disparity between the numbers of the males and females who helped their families. Although some parents reported that their sons helped the family, for example, by working in the family shops or on the farms, unlike most girls, who felt the responsibility to help their family, most boys they said, do not feel it as their duty.

Parents said that secondary school girls in general lacked enough time to study their subjects and attained less grades than the boys. But when the question was made more specific and directed to them, 60% of them said their daughters had enough time to do their schoolwork. Most of these participants were individuals with higher educational

level and understand what it takes to be a secondary school pupil. Thus, they probably allowed enough time for all their children to study, but it would be different with parents who did not understand the difficulty their children may be encountering.

### 4.4 Parental encouragement

The need to focus on the ways in which parents can actively encourage and support their children's school learning in home settings, rests on at least three significant arguments. First, a critical reassessment of both the cumulative evidence and professionally led good practice suggests a clear need to realign thinking and practice. Second, whilst parents have widely differing viewpoints and expectations, they also share common concern. Third, homework is being given a higher priority, extended to children of all ages: Block 2 Family and school (1997: 54). These are all issues considered important in the UK; however, in the light of this outlook and to obtain the views of the Eritrean parents as to how they encourage and support their children, they were asked: *Do you give equal encouragement and time to both your boys and girls to do their homework?* In response, 87% of the parents said they gave equal time and encouragement to all their children irrespective of their sex, and a few of them helped them on regular basis. One mother in the interview said that she gave more encouragement to the girls because she felt that the society in general denied it to them, but could not help them academically because her level of education would not allow her to do so. Still in the interview, one father said that he and his wife gave equal encouragement to their children, but he argued that his girls seem to be 'careless' about their education.

## *5. Gratitude*

Parental involvement in education contributes to the students' success, but at times teachers and administrators fail to establish a strong link between home and school. A cause for conflict between families and schools emerges when members of the teaching profession dismiss parents, either explicitly or implicitly, from the process of educating their children, (Coleman 1998: 13). For the parents, the message that the task should be left to the professionals negates the value of the family's contribution to a child's progress and disenfrachises the parent. Therefore, some parents, particularly those who were interviewed, were appreciative for being invited to give their views about the schools where their children received education. This, as some of the participants have

pointed out, were only called to schools when their children were in some kind of trouble or when there was a task to be done. For example, if needs arise to do fund raising for the school, but they were never invited to give their views about the running of the schools, where their children received education.

My interview with one of the fathers was very interesting. This father felt honoured to be interviewed by me, "ሲው ቲ ጋል" (iwtee gual) as he called me, which means "a successful female". He was extremely happy to know that not only was I able to succeed in completing my secondary education, but that I was able to go beyond that and become a member of the university teaching team. He was so excited that he wanted to know if my parents were still alive so that he can congratulate them for having such an "extraordinary daughter". Above all, he thanked me for asking him to make a contribution to my research, because like all parents, he was only invited to school when there was a task to be accomplished but not to give his views, regarding the education of his children.

It was not only the interviewed parents who were grateful for being included in the study, some of the parents who filled the questionnaires also expressed similar views which I include here. One parent wrote:

> *"Thank you for trying to find out the opinions of parents concerning the education of our children. Keep up the spirit of involving more parents in the study. Parents have both the interest and the experience to share with those who work in education."*

I believe that parents have interest in sharing their views about the education of their children with the school authority, but unfortunately very little of that is happening. In fact, that is one of the reasons I decided to include some of them in this study. I am of the view that parents have interest in the education of their own children more than they are given credit for. I also feel that parents give too little contribution because they are not invited to do so, as they would like to. Moreover, there was a signal of unhappiness on the side of the teachers, who pointed out that parents left the entire responsibility of educating their children to them alone. But, as was indicated above, parents feel that they should be involved more than they actually are. Thus there is either lack of understanding or breakdown of communication between parents and teachers.

## *6. Feed backs and Recommendations*

Since one of my aims for allowing parents to participate in this study was to seek their contribution, here are some of their recommendations for the society at large and the teachers.

- *There is a need for encouraging parents to change their views concerning their daughters' higher education.*
- *Girls do not get equal treatment to that of boys, from their parents, towards their education. For example, early marriages and dropout of girls from schools caused by parents, are some of the major problems that need consideration.*
- *Girls would achieve the desired goal if they had proper advice, encouragement and enough time to work on their studies.*
- *There is a need for gender awareness and a sensitisation programme for teachers, especially for those who are not too sensitive to the issue.*
- *Some teachers need better training and increased commitment*
- *Effort should be made to make the society aware that males and females have similar natural intellectual ability and if equal opportunities are given to them they can produce similar results.*

Furthermore, according to these parents, to improve the educational results, it is important to implement the following points:

- *Reduce class size*
- *Reduce teachers work load (increase the number of teachers)*
- *Resolve shortage of text books*
- *Update libraries*
- *Upgrade teaching methods*
- *Equip science laboratories and use them more effectively*
- *Stretch secondary education, i.e. make it 9-12*
- *Expand school infrastructure*
- *Motivate learners to study*
- *Invite parents to both encourage and check on their children's progress*

Some important contributors to pupils' lack of academic achievement, in the area of science, as parents pointed out, are:

- *Low parental educational level*
- *Parental economic status*
- *Instability of the nation*
- *The nations' low scientific and technological level*
- *Lack of variety of college offering after secondary education and*
- *Lack of appropriate job opportunities after the graduation from secondary schools.*

I am very pleased by most of the parents' responses and their contribution to the study and I can say that I am even more pleased by their level of interest in wanting to make a contribution to the running of the schools where their children received education.

## *7. Summary*

The data in this chapter is gathered from Eritrean parents whose children were in secondary schools. These parents were 41 in total, i.e. 30 whose level of education was $12^{th}$ grade or above and 11 whose level of formal education was below $8^{th}$ grade. The reasons why parents were included in this research were to have representation of parents in the study but above all to obtain their valuable contributions to the study. Questionnaires were administered to the former group (to 30 parents) and the interviews to the latter (the 11 parents).

Students' commitment to schooling or engagement in learning is primarily shaped by parents through the situation at home, i.e. through the parental involvement. Therefore, in the questionnaires, parents were asked if they helped their children at home, for which 83% of the respondents said they either helped their children themselves or paid some one to help them on a regular basis.

Parents like all the other participants in this study, said that there was a difference of achievement between their boys and girls, but the majority of them did not think that there was difference of intellectual ability between them. Rather, they said it was the lack of motivation in girls to achieve good results, which was responsible for the girls' lack of achievement. Furthermore, they added that there may be a difference of individual talents but they do not attribute this to the child's sex. The results of the different attainments by the pupils, they said was caused by the situation in which boys and girls were made to live in their every day life and girls were less motivated than boys to achieve good results. To motivate all children to attain better grades, parents said that children must be helped and encouraged by adults, i.e. by parent and teachers alike.

Participants in this study said that they expected girls to help at home, and 63% of the girls as opposed to only 13% boys helped at home on a regular basis. Even though 60% said their own daughters had enough time to study, they pointed out that the majority of the Eritrean secondary school girls did not find enough time and support to achieve in their education.

The feeling amongst the Eritrean society was that parents were called to the schools only when there was some task to be done, but not to give their opinion about the school where their children received education, therefore many were happy to give their own views in this study.

As one of the main reasons why parents were made to participate was to obtain their recommendations parents offered various recommendations to school administrations. policy makers and parents.

## *8. Concluding remarks*

This chapter discussed views of parents on several issues affecting pupils' achievement on secondary science education. It touched upon several topics such as: society's attitude to girls' higher education, society's interpretation of why males and females attain different results in science education, parental involvement in their children's education. In the end it concluded with a list of recommendations directed to the policy makers, parents, teachers and the pupils.

This is the last chapter on the participants' views and the next one will be the summary of the study and the implications of the findings.

## *Chapter Nine*

### *Summary of the study*

### 1.1 Introduction

In many of the Developing countries, including Eritrea, there is a widely held view that boys and girls have similar chances of attending primary and secondary education. But a closer examination of the drop out rates and the percentage of girls to boys, as they move from primary to secondary or increase in age and grade reveals, a different and rather perplexing picture. This, as indicated in chapter three in tables 2-6 and the tables in appendix 5, which seems to substantiate the fact that Eritrean secondary school girls are not only under-represented but also under achieve in many areas, especially in science. This state of affairs has triggered many questions: a) why this under-representation? and b) why the disparity in achievement? These in turn led to another set of questions like a) are girls less able to achieve than boys in Eritrea? or b) is the disparity caused as (Bendera's 1997: 58) finding of a study in Tanzania seems to suggest, by the girls 'gender role identity'? Fully aware of the multiplicity and complexity of the factors influencing and contributing to the under-achievement of girls in science, and on the immense impact these may have on their chances to engage in careers related to science and technology, the study sets out to find out why. In the hope of obtaining answers to this serious disparity, I prepared a survey and interview questions which were directed at different participants. These included the secondary school pupils, science teachers, directors, parents and university students. Of these, the pupils, teachers and parents participated, both in responding to the questionnaires and the interviews, while the directors and university students participated only in responding to the questionnaires.

To help focus the scope of the study, I consolidated most of my earlier questions and hypotheses into a major research question, supplemented by associated sub-questions, discussed in the section below.

Eritrea is a new nation, hence, different and 'special' in comparison to the countries whose research findings I have examined. Besides not having very long years of history of education, when it was just beginning to focus and organise its forces into education and technical development it got trapped by a new tension which stared as a border

conflict with its neighbour Ethiopia and stopped the initiated progress. Hence, sad to say that the reference literature is based on Western world studies followed by the Developing world.

## *2. Conceptual frame work*

Post-structuralist theory disagrees with the view that all power is possessed by one particular group or set of institutions, that it is dispersed from the centre, and that it is primarily repressive. Furthermore, this theory does not see power as centrally located and dispersed downwards, it explores the ways in which the socio-cultural hegemonies of dominant groupings are acquired and challenged. However, it does not deny broad patterns of domination and subordination, what it denies is that one theory fits all situations. An individual's identity, then is the on-going result of the discourses that have shaped her/his history and his/her world; it is a continuous process of formation and recreation.

As seen from a post-structuralist theory, girls' identities are shifting and fragmented, multiple and contradictory, displaced and positioned as they are across the various discourses which historically and currently constitute their lives in and out of school. Post-structuralist theory encourages gender reforms, recognises that all boys and girls are complex human beings and active readers of their culture. Therefore, it encourages openness for a better understanding of situations and dilemmas which girls as well as boys face at school and outside school. Moreover, it suggests that as teachers and students interact with gender-related knowledge, such knowledge is negotiated and possibly even transformed in the process. In conclusion it suggests that whatever the moment or the level, the meaning of gender reform will be constantly contested, negotiated and appropriated.

Contrary to what has been pointed out in the literature in the paragraphs above, the data obtained from the participants in this study draws a rigid and deterministic social sexual identity formation process of children and adults. The traditional perception and practices followed by the majority of the participants in this study stand in almost total opposition to the findings indicated in the literature. The findings indicated that the majority of Eritrean people live by and believe in a rather rigid sexual socialisation in which males and females have ascribed laws to live by. Hence, a women's job is to stay at home with the children and care for the various family needs and a men's job is to be

the main breadwinner and the head of the family. There seems to be too little room for flexibility of views and exercise of ones' duties in the traditional Eritrean society. It was pointed out that girls are less motivated than boys to study science in secondary education, because there was a belief that science education was not important for girls' lives since they were not expected to be future scientists, engineers, or doctors.

Ironically, no one, not even the girls or the mothers in this study have suggested any alteration to the traditional practices to make life easier for the girl-pupil. Eritrean traditional practices are so rigid that they tried to convert even those who were once liberated or emancipated women (the ex-fighters) to become submissive and subservient to their male counter parts who were their equals in every aspect of life, as this quotation indicates. According to (Stifanos 1997: 678):

> *During the liberation struggle, many women's activities had much exposure to collective life, which allowed gender equality to women to work and live side by side with men, to perform tasks formerly reserved to males, and in many instances to have their effectiveness judged without bias. In this context they abandoned subservient and different instance that women had traditionally assumed.*

The quotation reflects the lives of Eritrean women in the 1970s and 1980s in the time of the armed struggle, while they were trying to fight the common enemy, the Ethiopian oppression. But once the goal of liberation was obtained, men and women appeared to have gone back to observe the rigid traditional practices making the lives of the female ex-fighters distressful. In today's civil society, these women (ex-fighters) are often penalised for their emancipated ways. These factors make me reflect very much and come to a conclusion that this is probably why some Eritrean girls fear the risk of being emancipated, since they have observed the fate of many of these women, call them, their elder sisters.

I have discussed the aspects of Eritrean culture, which reflects opposition to the post-structuralist theory, but in this section I will discuss the aspects of the culture, which may partly agree with it. In the context of education, post-stucturalists, (Davies 1989) and (Walkerdine 1981) and Davies and (Banks 1992) point out the various and contradictory discourses of feminine subjects with a range of ways in which girls can be girls. Being a girl in an educational setting, takes on various possible meanings that shift within discursive contexts or within different sets of taken for granted meanings. The possibilities for girls are both limited by the dominant conceptions of femaleness and

are also variable in so far as those conceptions differ, (Jones 1993: 159). Furthermore, this theory explains that in their daily lives, girls may engage in several meanings or positioning simultaneously, and they may take up contradictory positionings. For example, a girl may be very assertive and independent in some situations and also very sensitive to and easily controlled by boys' points of view. So within an educational setting, which emphasises particular feminine decorum in its conception of girls, boisterous girls may be positioned as tomboys, naughty, or difficult. It also means that both boys and girls are displaying femininity and masculinity. In other environments where physicality is encouraged, these same girls will be positioned quite differently, for example, they may be considered as admirably competent. More importantly in the Eritrean context, where females are associated with being talkative, to avoid such a label they try to speak down, even when it is important that they speak up. For example, when asking or responding to questions in a classroom. But if they fail to do that, they are labelled passive and un-interested in learning. Because girls find themselves in contradictory positions, they develop feminine subjectivities in different variable settings, which might differ significantly from place to place.

### *3.The research questions and key answers*

1. *Why does the achievement gap in Eritrean secondary school boys and girls increase as their ages and grades increase?*
2. *What factors produce the difference in boys' and girls' academic performance in Eritrean secondary schools, especially, in science?*
3. *To what extent are pupils' attitude and confidence in learning science subjects, and their consequent success affected by gender?*
4. *What part do teachers' attitudes play in the performance of girls in sciences?*
5. *Is there a relationship between parental educational level and the child's achievement?*
6. *Do parents generally expect less of their daughters than of their sons in science education?*
7. *Does Eritrean society encourage boys and girls to achieve in secondary education especially in the area of science?*

Most of the explicit and implicit answers to the questions are already discussed in the earlier parts of this study but the following paragraphs will try to respond to some of the key questions in summary form.

- *Why does achievement gap in Eritrean secondary school boys and girls increase as their ages and grades increase?*

When children are young they do not know what it is to be a boy or a girl, all they know is how to be children. Little boys and girls go to school together and learn all the subjects together and when they go home they play their games without worrying about gender related issues and study their subjects, consequently they obtain similar results irrespective of their gender. But as they grow up, girls are gradually introduced to the domestic chores and are made to share responsibility of the families with their mothers. Above all girls are introduced to the traditional values and attitudes, which suggests that grown up girls do not need as much formal education as do boys, hence they are made to feel more responsible towards the family needs. As a consequence their concentration on their education is hampered and they start to focus more on the needs of serving their families instead. Boys on the other hand, are left free to concentrate on their education, moreover they are encouraged by their families as well as the society at large, to study harder because their future depends on the level of their educational attainment. Furthermore, unlike the girls, secondary school boys are encouraged to study science, because they are expected to be future scientists, engineers, doctors, etc. Therefore, as their ages and grades increase, girls' grades decrease and the gap of attainment between boys and girls widens.

- *What factors affect Eritrean secondary school boys' and girls' achievement especially in the area of science?*

The factors contributing to gender differences in achievement may be that girls are negatively affected due to the educational preference given to boys; i.e. while boys are given chances at home to concentrate on their studies, girls are overburdened with domestic responsibilities. Furthermore, attitudes held by the community and the low educational level of the parents, especially mothers, in most cases seem to convey the message that secondary education is not important to girls' lives, and were responsible for the different outcomes. Besides science subjects are considered men's subjects in Eritrean society, thus not very important to a women's life.

The findings from African contexts suggest that traditional practices encourage girls to have as their only goal to marry and have a family, rather than study science to become scientists or engineers. Girls, on the one hand, because they observe the traditional practices, lose the hope of achieving as much as the boys, so most of them loose the interest in their education and concentrate on something else. In schools, girls are made to believe that science subjects are not important for them. This has resulted in girls'

lack of interest in science subjects. This study also revealed that society, parents and teachers groom girls to believe that their principal role in life is to get married, bear children and take care of the family. As a result girls themselves, parents and teachers do not see why girls should trouble themselves with difficult subjects. Therefore, all these factors cumulated produced the disparity of achievement between secondary school boys and girls.

- *To what extent are pupils' attitudes and confidence important in learning science subjects and their consequent success affected by gender?*

There seems to be no evidence that girls are generally less able than boys to achieve in science. On the other hand, probably because of the societies' mediocre attitude towards their higher education and because of the girls' negative experiences, many of them develop unfavourable attitude towards learning science and concentrate less on their studies.

Information on sex differences in teaching and learning is not clear, however, according to researches in the UK, there are some suggestions, that girls and boys do have different learning styles and problem solving approaches. Moreover, other studies indicated that boys have a more favourable attitude to science than girls do at least in older age groups, where positive attitudes are associated with high achievement. Besides, experiences of boys and girls indicate that they choose different games while growing up, i.e. boys imitate the fathers' jobs in using science-related games. Such games may include the use of electrical objects, items which have something to do with buildings, making or fixing cars, manipulating chemicals. These games may help boys to like science learning more than girls would. Girls on the other hand, may play games, which reflect their mothers' jobs, which usually have very little connection with science subjects. Therefore, because of their household and play experiences, boys may enter secondary school ahead of girls in their science learning. Moreover, unlike the girls who study science subjects only because they are subjects offered in schools, boys enter secondary schools with a more favourable attitude towards sciences because they learn science with careers in mind. Science teaching in secondary schools builds on their childhood experiences and in the case of boys a positive feedback linking achievement in an attitude towards science develops. For girls starting off with an unfavourable attitude can have a negative characteristic, so that by the age of secondary school, boys are generally ahead of girls in science learning.

There is a common understanding that children learn better if they feel empowered, and valued; however, teachers' or society's low expectations of them, might impede this, predicting and encouraging their failure. Moreover, the labels people use for themselves, are important aspects of the way they value or fail to value themselves. Other people's labels may affect pupils, especially girls, if they feel undervalued. Besides, the findings in this study suggest that parents and teachers give more attention and encouragement to boys than to girls to achieve good results in their education.

Belief in ones' own capabilities is a very useful attitude and it may be linked to various positive outcomes, encouraging individuals to be adventurous and ambitious. Moreover, the importance and effects of a person's self-conception for failing or being successful, contributes to a person's assessment of one's own ability and to expectancies concerning success or failure in the future. My view is that Eritrean pupils, especially girls, encounter academic failure and with accumulation of further failure, they become increasingly distressed and experience feelings of distress, hence they develop a low self-esteem, which may cause them to develop an unfavourable attitude to learning of science subjects.

- *What part do teachers' attitudes play in the performance of girls in sciences?*

Teachers' attitudes can be a powerful stimulus to all pupils, but especially to girls' success and/or failure. Some of the teachers in this study were found to unintentionally reinforce stereotyping of school subjects (as may have been their experience) by their assumptions about pupils' abilities and interests, leading them to treat boys and girls differently. Both the secondary school pupils and the university students pointed out that some of their science teachers failed to treat boys and girls equally in their classrooms. Moreover, I would like to bring to light, reactions of a couple of parent/teachers who in the interviews have pointed out that their daughters were enigmatic and irresponsible pupils. My conclusion is that if parent/teachers, did not have any problems speaking to a researcher about their own daughters in that way, they probably will not have problems conveying such a message to their children whether it is in a classroom or in their home environment.

- *Is there a relationship between parental educational level and the learners' academic attainment?*

Both the literature and the findings in this study indicated that children's academic attainment may be influenced by the parental educational level. That is, the higher the education of the parents, the better the attainment of the children and the less the education of the parents the lower the attainment of the pupils, will be. If parents are highly educated, they become mentors to their children and they may both encourage and support them to attain better education than the less educated parents. On the contrary, the less educated parents may not be equipped to give proper support to their children for the simple reason that they may not understand the gravity of the problems the children may be suffering from. Besides even if they (the less educated parents) understand the problems and had the desire to help, they may lack the ability to do so.

- *Do parents generally expect less of their daughters than of their sons in science attainment?*

A number of studies have shown that some parents expect less achievement from their daughters while others expect less from their sons, particularly in mathematics and science. Most of the participants in this study, including some pupils have pointed out that they expect better academic attainment from boys than from girls because their experiences have been that boys almost always obtained better results than girls at secondary level and above. As parents in this study expect less academic attainment from their daughters, they convey such messages to their children and the children internalise the view. Several participants in this study said that they expected boys to obtain better results than girls. The reasons for their claims are: a) boys were more intelligent than girls, b) girls were less interested in learning science subjects, c) girls had less time than boys to study their subjects in secondary school level.

I wonder what their criteria for measuring the intellectual difference for boys and girls is when boys and girls live very different experiences and are made to do very different activities but above all boys and girls are dictated to concentrate on very different aspects of life. Girls are encouraged to get married and take care of the their family while boys are strongly encouraged to study hard and obtain good results in all subjects, but especially in science.

- *Does Eritrean society encourage boys and girls to achieve in secondary education especially in the area of science?*

It was pointed out over and over in this study that Eritrean society does not encourage boys and girls to attain equal results in science. In fact the society was found to discourage girls from achieving good results in secondary education in general and in science education in particular. The messages girls received were that their main jobs were to succeed in being married and become house makers. Therefore, parents, teachers and students themselves expected girls to do the house chores as their primary duty hence. None of the participants in the study objected to the fact that girls had to spend a lot of their precious time doing the house chores in stead of concentrating and studying their subjects.

Up to this point I have tried to respond to the key questions of the study and the following subsections will try to respond to the remaining questions focusing on the learning style of boys and girls first and then on the factors which create gender differences in achievement.

## *4. Summary of the study*

### 4. 1 Factors affecting learning

Any factor, which restricts a child's path of progress, is seen as limiting access to education. Such factors may be divided into two groups, i.e. 1) those which originate from the child (ability in performance) or from the home (parental educational level, and the willingness to encourage the child's education), and 2) those which are determined by external agents, such as society and the teachers. Factors originating from the learner are those which affect achievement or failure. These are motivation of the pupil and the attitude to education, as pointed out by (Ashcroft et al. 1997: 131), may encourage the learner, where the attitude is positive, pushing him/her to perform well and striving to get a place in the university.

#### *4.1.1 Learning styles*

Several research findings pointed out that boys and girls in a younger age have more similar interest, but as they grow up their focus of interest changes. As pointed out in the literature review, information on sex differences in teaching and learning is largely anecdotal, however, there are some suggestions that girls and boys do have different learning styles and problem solving approaches (Murphy 1998). Murphy's studies indicated that boys have a more favourable attitude to science than girls do, at least in older age groups where positive attitudes are associated with high achievements.

The factors contributing to the gender differences in achievement are that girls were negatively affected due to the educational preference given to boys; i.e. while boys were given chances to concentrate on their study, girls were overburdened with domestic responsibilities. Furthermore, attitudes held by the community, the attitudes of the parents and the low educational level of many parents, which in most cases seem to convey the message that secondary education is not important to girls' lives, were responsible for the different outcomes. Besides science subjects are considered men's subjects thus not very important in a women's life.

According to (Darling 1996: 94), comparisons were made internationally, about the situation two decades ago. Hence, it was found that, from the position where males did better in the greater majority of countries and there was clear evidence of an overall reduction in differences over time, with a shift towards equalisation in relative advantage for girls. However, in the international studies pointed out here, the difference in performance were not invariant across countries. In some places e.g. Kenya and Tanzania, boys did better than girls, in others there were few differences, while in others e.g. UK and Caribbean states, girls did better than boys. Furthermore, the differences between boys and girls were not invariant over time.

### *4.1.3 Outside school factors*

Gendered roles in society change the balance of incentives for girls and boys to attend school. According to (Colclough et at. 2000: 7), in societies where the main leadership role in local and national life are occupied by males, where marriage of girls occurs at a much younger age than of boys, where the belief discourages social interaction between sexes, or where conventional opinion encourages women to see their future as being centred on the home and the family, the incentives for girls to attend and perform well in school are less than for boys. Unfortunately, what is described above seems to reflect the situation of most Eritrean females.

As indicated above factors, which come from outside the school, may have a direct affect in learning on the student's learning opportunities, hence on academic results. For example, parental background factors, (Kutnick 2000: 71), may be important in several ways. One of the most important factors here is the educational background of parents, which could act in several ways. These are such as the influencing of the child's attitude to education by the role models they provide and the parents' own attitude to education

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and hence their aims for their children's education. In chapters five to eight, it was pointed out the importance of the parental educational level and how educated parents either gave extra support to their children by giving special assistance themselves or paid some one to help with the difficult subjects. Above all it was noted that highly educated parents became the mentors to their offspring. Unfortunately, it was also pointed out that a larger number of pupils in this study had parents with no formal education and that too many pupils came from different neighbouring villages and could not benefit from the coaching of parents. Moreover, socio-cultural factors and the amount of help required in the home, the limited time available for studying, both at home and in school have, a negative effect on learning; thus most of these pupils never reach the level they hoped to reach.

### *4.1.4 In school factors*

The international cross-cultural uniformity of gender difference in science achievement suggests that cultural factors alone cannot account for them, (Solomon 1994:134). This means that there are other additional factors, which are best known as "in-school factors" which play a significant part in causing or contributing to the disparity in science achievement between boys and girls. These include a) the masculine image of science in the schools and in society, which alienates girls and discourages their engagement and b) the overall school environment which may be more conducive to attendance and performance for boys than girls. In relation to the latter point, (Colclough et al. 2000), argue that male teachers may not provide girls with sufficient support, in fact, they may even be threatening at times, as experience, which seems to be shared by many Eritrean secondary school girls. This coupled with the rather negative experiences girls go though in life outside the schools, may go a long way to explain more lack of self-confidence and fear of handling practical laboratory equipment.

There are also other related factors, which have direct bearing on the teaching/learning processes and which may thus affect the different attainment in science exam results between boys and girls. These pertain to the quality of the teachers, the facilities available in the school and the adaptability of the teacher to the prevailing conditions. All of the in-school factors, which are clearly identified in the literature review, are also endorsed by the findings of this study. Additional messages which seem to have come loud and clear from the findings of this study are: a) the impact of acute shortage of

teaching and learning resources (in exam results); b) the negative impact of excessively large classes on the outcome of learning and teaching; and c) the consequence of the failure of the teachers to use a variety of methods of teaching, due to the lack of professional development opportunities.

### *4.1.5 Irrelevance of science curriculum*

I could not investigate enough the science curriculum because I was not able to obtain the complete package. However, as it was pointed out by the university students in chapter six and by some of the teachers in chapter seven, the science curriculum is borrowed from the west and taught in our secondary schools without much alteration or adaptation. Pupils also have suggested that most of what they learn was not applicable to their daily lives. Besides the content being foreign to the pupils experience, it was taught in English. Above all, pupils had to memorise the subjects because they could not see much of it with their naked eyes. Most schools could not do experiments for the lack of science laboratories. These are problems affecting all pupils but the situation becomes more complicated for the girls because they have less chances of referring to other books from the libraries and exchange ideas with their peers, as some of the boys would do. The reason for these being, that girls are not allowed to go out of the house to study in the libraries or in their peers' homes as much as the boys do. Many parents do not allow their daughter to stay away from home for too long, especially when it gets dark.

## *5. Factors affecting gender differences in performance*

As measured by examination results, the overall level of performance of girls in science is significantly lower than that of boys. Several obstacles originating from in-school and out-of-school factors, have been suggested for such differences. These obstacles include:

- *traditional social practices and attitudes towards girls education, e.g. expectation of early marriage,*
- *the belief that educating boys is more crucial given their ultimate roles as family heads and breadwinners and the myth that boys are more intelligent than girls,*
- *competing demands on girls time,*
- *teachers' attitude and styles of teaching,*
- *examination types,*
- *the prevailing difference of interest between boys and girls in science subjects.*

As the list above suggest, reasons for the pupils' disparity in achievement, (i.e. girls' poor attainment), have been many fold, but not enough attention is given to solve the problem. In some cases the commitment to overcome the problem has never gone beyond the level of political statements; in others, there was lack of systematic in-depth analysis or the understanding of the magnitude and root causes of the problem. Moreover, according to (Brusselmans-Dehairs et al 1997), in the western world, boys out perform girls on science tests across all age groups. The better performance of boys increased, as they became older.

The feedback received in class leads girls to have lower expectations of success and affects their interpretation of future experience. Moreover, boys feel confident that they know the answer, while girls are usually inhibited by the belief that they should know the answer. The combination of girls' timidity and boys' boasting, leads to girls being marginalized in the laboratories. Effects of this kind will lead to a real lack of skills in girls and to a substantial problem in their motivation.

### 5.1 Traditional social practices and lack of encouragement

The international studies indicated that in the Western countries, there was a clear trend towards equality of performance between the sexes. The trend was consistent with social changes such as the increasing proportion of women in the labour force, the increase in the age of the first marriage, the substantial drop in the fertility rates and the family size, which are not the same in Eritrean context, as will be presented in the next paragraph.

In contrast, customarily girls in Eritrea, as the findings of the study imply, are married when about 18 years old and are expected to start a family as soon as they possibly can. Hence the knowledge of this fact of becoming a mother of many children, constantly thinking about their family needs before their own, discourages them from taking their studies seriously. The fact that they know society expects them to comply with these expectations, with not having their own income, with depending on their husbands' only income, have also negative consequences on the importance they attach to competing with the boys in science or other examinations.

## 5.2 Competing demands of girls' time

Over and over in the different parts of the thesis, especially in chapters five to eight, it was pointed out that girls spend a lot of their time at home doing the house chores; furthermore, it was pointed out that home activity takes a lot of girls' precious study time. At this point I would like to add that, if males are good in their education, as (Ogbay 1999) has suggested in her study, it is at the expense of the female members of their family, whether that is a sister, mother or wife. Since females have to prepare the meals, tidy up the house, do the laundry, iron their shirts etc., (while the females do all this work), males use their time for studying or entertaining themselves. I would like to include Sewit's comic strips from Eritrea Profile, March 8th and April 12th, 1997, appendix 6, which depicts both urban and rural Eritrean girls, who have full time engagement in helping their families, yet are expected to attend school as their counter parts, the boys, and are expected to attain the same results.

Moreover, I would like to share the view of one of the women teachers whom I interviewed. This woman once had a brother and a sister (pupils) in her class. She said that the boy was younger, but always the first in the class. The girl, on the other hand, always failed, and in fact as a punishment, got dismissed from the school. This teacher wondered what was happening and asked the girl what was the matter with her and why was she so different from her younger brother. The girl's response was; **ኣነ ድኣ ሸቃሊት እንድየ!** (ane dea shekalit in dye!). This was a very strong reaction, thus, difficult to explain exactly. However, I will try my best to interpret its significance, which I think can be expressed to mean: 'I am nothing, but the servant of the family'. I felt that it was unfortunate that the girl was dismissed from the school, because she deserved help not dismissal from the school; but unlucky, that is the reality for many girls in our secondary schools. Often the '**victims are blamed**' instead of being helped. Moreover, I would like to share a saying, which is sometimes used among the Trigrigna speaking group of which I am a member. It used to irritate me every time I heard it and it goes like this; "**ንጓልን ንኣድግን ኣይትንሓፍ በለ ማጽሓፍ**" (ngualn n adgin aitinhaf bele meshaf), which means, 'girls and donkeys are not to be spared', i.e. they must work unceasingly deserving no compensation. It hurts above all, because a girl is equated to the most humble yet hard working animal, the donkey. This finding is significant, because it is the experience of many girls in secondary schools and if such situations are not changed,

changed, the end results will be the perpetuation of the old reprehensible cycle of educational disparity between males and females in the society.

### 5.3 Teacher's attitude and teaching/learning styles

In the study of (Whyte 1985: 21), in the UK teachers dispensed with the system of addressing general questions to the class, which usually resulted in mostly boys putting up their hand to answer, and often directed questions to specific individuals. Moreover, as pointed out in the literature review, a pamphlet entitled; 'Towards equality for boys and girls (1996)', also in the UK, the informal curriculum describes the ways in which schools transmit values and attitudes to pupils outside the formal curriculum.

Similarly, Eritrean schools were found to reflect the attitude of society, therefore, it is important to explore the concepts of masculinity in a wider sociological context. As pointed out in chapter two, there is considerable research and inspection evidence to suggest that, although an individual's attitude to learning is clearly not predetermined by his/her gender, there are tendencies for girls and boys to respond in certain general ways in given circumstances. However, over all, the research conducted to find out the most effective methods of teaching, has been inconclusive. Nevertheless, I maintain that it is important for the teachers to find the most effective ways of teaching the lessons, keeping in consideration the learners' needs, instead of just following a lecture method, irrespective of the topic, as was pointed out in chapter six.

I am in agreement with the view that most Eritrean girls would have been better achievers if they had been given due attention from their teachers in school and from parents at home. But the findings suggest that the opposite was the case, i.e. teachers paid more attention to males than to females in most science classes and so did the parents at home.

To help clarify and specify teachers' attitude in class, pupils were asked to give their views in the interviews and in the informal discussion, hence, several pupils expressed their dissatisfaction about the teachers' discrimination against weaker students. I will present the example of one girl's impression, who expressed her disliking the reactions of some of her teachers, because they shouted at the weaker students, especially when these were not able to give the correct answers. It seemed that she was one of the brightest pupils, who was never shouted at or discriminated against, but she expressed

her anger towards those teachers who discriminated against the weaker students, (she was not referring to girls in particular).

Over all, boys and girls expressed similar opinions about their teachers' negative attitude to girls in science. However, most of them appeared to accept the situation as the norm, whether or not they agreed with it. On the whole, teachers seemed either to be unaware of their differential treatment of the pupils or simply accepted such behaviour as the norm. Despite what the pupils have pointed out, teachers claimed to be genuinely committed to equal treatments of both sexes and claimed to have encouraged both boys and girls to participate in their classes. Furthermore, teachers said that they incorporated good teaching strategies. This suggests that they were perhaps unaware of some of their reactions or were unwilling to admit being gender biased or biased in favour of the academically strong pupils.

**5.4 Examination results**

An important factor concerning achievement in girls, as pointed out in the literature review, is the examination type, which is mostly of mutiple choice nature. Some possible explanation for the gender difference on objective tests, are based on the hypothesis that boys perform better on the mutiple choice items, (Beller and Gafni 1991: 45) & (Whyte 1985: 18). The next very important in-school factor lies in the national exam results, with an important barrier to access fixed by the pass mark, since anyone who fails to reach the pre-requisite standard is denied a place in the university. It may be suggested that the pass marks, are largely determined by the availability of places at the university. Although, Yisak, the University's president, would disagree with this view, since he has pointed out that the university has lowered the requirement in order to accept more candidates, (Eritrea Profile, Sept. 13 1997). Yet one year later, in (Eritrea Profile, Sept. 5, 1998), he emphasised the increase in the number of departments and at the same time pointed out that the number of students enrolled was on the increase every year. My view would be that the increase in the number of students enrolled depended upon the increase of the number of departments and in the labour-market. Yisak further pointed out that.

> *Faculties can only take the number which can be absorbed by the different ministries and that the university takes into consideration a quota in equipping the students with specific requirements to fulfil the demands of the partners.*

All these lead me to conclude that the number of candidates allowed to pass every year is determined by the number of places available in the university and in the labour-market.

### 5.5 Prevalent difference in science interest

At all levels of schooling, males more than females were found to be interested in science and were more likely to aspire to a science based career. This is consistent with the UK's research findings, for example, (Murphy 1998 and Woolnough 1994). Because of the social structure and experiences, girls were less interested and did not envisage a career for themselves as scientists or engineers. Boys on the other hand, were more interested in sciences including physics and technology, in learning practical skills, and in studying science with a career in mind. Although there were few girls as indicated in chapter five, with a clear a career in mind, most of them just learned the subjects because they happened to be in science streams. Moreover, there appeared to be a close relationship between the pupils' interests in science and the career children envisage for themselves. As the fields of engineering and technology were mostly males' jobs, males showed more interest in learning physics, which could lead them to attain those types of jobs.

Pupils in the interviews reflected that science subjects were difficult, and girls especially seem to be discouraged by the difficulty. Science subjects are often perceived as remote and impersonal and girls are typically person-oriented. Besides, the masculine image of science and scientists may be a powerful deterrent to girls, although most of the participants in this study, especially the teachers, do not feel that science reflected the masculine images. Literature suggests that the attitudinal factors, difficulty and masculine image-apply more strongly to physical science than to biological science. Probably because of what is indicated above, girls showed less interest in science in general and in physics in particular.

## *6. Implication of poor science education*

Sources consulted in connection with this study clearly indicate that the potential of women to contribute to national development cannot be disputed (Sezaguli 1997: 2). Unfortunately, there is also plenty of evidence that currently women are not participating fully in the various social, economic and educational spheres, especially in

regards to design, implementation and evaluation of the on going developmental, scientific and technological projects in Eritrea.

At the opposite end of the spectrum, there are also numerous studies which demonstrate that in the long run, increased education for women could contribute to improved quality of life and enhance national development through increased economic production, improved hygienic and nutritional practices, as well as reduced child mortality and better nutritional practices: (Bendera 1997: 84). This according to Swainson (1995: 4) is because schooling tends to improve the mother's knowledge and use of health practices. Each additional year of schooling is estimated to decrease the child mortality, and the influence of mothers on their children's education is important particularly in the African context. But despite this generally accepted evidence and the fact that science and technology are becoming dominant activities everywhere, including the developing nation of Eritrea, the education system in the latter seems to be riddled with numerous problems. For instance, the findings of this study clearly show that the quality of education in general and of science education in particular, leaves much to be desired. More specifically the curriculum being provided does not seem to meet the needs of the learners.

Moreover, apart from being overworked, teachers, seem to suffer from negative stereotypes about the achievement of girls in science. Such view is also, unfortunately, shared by some parents in this study. Furthermore, the education system, as indicated in chapter three, seems to be examination geared. Because of all this, every year, thousands of secondary school leavers are left unable to join the only university or to find appropriate jobs.

The above factors are bound to have severe implications on the nation's development in general and its youth, in particular the females. First, failure to increase the participation of women in education is likely to affect the economic output, increase child mortality and lower the hygienic and nutritional practices and reduce mothers' input to their children' informal education. Second, the country's ambition to modernise and to enter into the arena of globalised science and technology, is bound to be hampered as a result of its failure to educate and utilise all of its human power. Third, continuing to use the outmoded social status criteria to select and promote its workforce or failure to revise its gender related traditional values and attitudes, is bound to impede

the rapid progress and change necessary for survival in the highly globalised economy. Finally, unless something is done to resolve the problems of the thousands of Eritrean secondary school leavers, e.g. by making the curriculum more practical, before it is too late, the nation will suffer from the literate but poorly educated young people it is producing at present. Moreover, unless the curriculum in general and science curriculum in particular, are reviewed and improved to fit the needs of the learners, today's pupils will be the nations' future burden. Furthermore, the country and its education system need to provide a stimulating environment during the early formative years of schooling. But this presupposes that a through in-depth study of how to tackle the gender-related expectations of parents and teachers in relation to female pupils is, undertaken.

## *7. Concluding remarks*

This chapter covered issues about the factors affecting gender difference in achievement. These included the traditional practices and the motivation and interest of the individual learners which, affect boys and girls differently. This chapter also has pointed out that there are in-school and out-of-school factors, which contribute to the achievements of the learners in the secondary schools. A major factor, which contributes to the lack of motivation to achieve good standard in science by both girls and boys, is the irrelevance of the subjects to their daily lives. Therefore, the policy makers need to reflect about the situation more deeply and resolve the problem earlier rather than later.

Now that we have seen the summary of the study, we will move on to the next chapter (final chapter), which is the discussion and conclusion of the study.

## *Chapter Ten*

### *1. Discussion and conclusion*

### 1.1 Introduction

Having summarised the major findings of this study in the preceding chapter, what remains now is to draw attention to some of their implications. With this objective in mind, this chapter, which is subdivided into five parts, will first present a summary of the key aspects of post-structuralist theory and then discuss how the findings of the study relate or otherwise, to it. The next part will explore ways and means of tackling the barriers to the achievement of girls in science in Eritrea, and make some pertinent recommendations. In the third part of the chapter, therefore, will be made the contributions of the study, while the final part draws attention to the study and its limitations.

Although this study has given specific attention to girls' problems of academic achievement, it is not much better for boys. From the respondents' points of view it is clear that the importance of girls' education is widely recognised and accepted, but the task that lies ahead to improve education of girls in Eritrea is enormous.

In this study, I have started to explore the views of different Eritrean people, i.e. pupils, parents, undergraduates, teachers and directors. Pupils and university students were from all over the nation, hence, representative of all the nationalities. Besides involving several participants, I combined both quantitative and qualitative methods integrating various triangulation methods in conducting this research.

In the hope of finding some similarity with the findings of this study, I have consulted a large amount of international literature relevant to the issue in discussion, focusing on the developing countries. Needless to say, the information I found enriched my knowledge greatly and contributed to the findings presented in the thesis.

### *2. Suggestions to tackle the problems*

Encouraging girls to embark on a scientific and technological career should not be taken lightly. After all, whether we like it or not, science holds some keys to national

development and to develop Eritrea's resources, so as to improve the people's living standard. Real and lasting change cannot be accomplished without co-ordinating strategies of active involvement of many parties and at many levels of the education system. If gender equality within education is to be achieved, all interested parties, i.e. parents, teachers, students and policy makers, must address the issue. This key area of concern must not be left for the girls and women to handle on their own. Some of the areas which warrant concerted effort and collective action based on wider debate and discussion include; curricular review, teachers' attitude towards girls' science learning and their teaching styles.

Curricular reviews may be necessary to promote the introduction of topics and approaches, which are interesting to girls as well as to boys. For example, as (Whyte 1984: 2) points out, instead of taking the structure of things and how they work, (a male interest) as a starting point, science courses could be taught within a framework, which involves consideration of the social implications and the everyday applications of science and technology. Such an approach would seem likely to increase girls' interest and enjoyment of science subjects. As it appears that both sexes are interested on the impact of science and technology on social and human affairs, boys will also benefit.

### 2.1 Teachers' attitude towards girls and their teaching styles

More importantly teachers need to find out the pattern of sex difference in the subjects' taken-up both nationally and in their own schools, in order to explore the possible causes of the apparent avoidance by girls of science subjects. In the process teachers may also find it useful to recognise and monitor their behaviour to avoid discrimination between boys and girls. Teachers should be aware of the effect and the appropriateness of their teaching styles in relation to the boys and girls they teach. Therefore, they should be sensitive to the relative effects of competitive and collaborative work and the style of discipline used in the classroom. The need for different system approaches to curriculum and teacher development appears to be indispensable.

### 2.2 Relevance of the science curriculum

In view of the findings of girls' lower performance in the secondary schools, I consider that a sound knowledge of the different factors impeding academic achievement to be vital for resolving the current gender gap. The mass failure of students in science subjects, in particular girls' failure, suggests either that subjects are badly taught or that they are beyond the grasp of many students. My recommendation is that the matter

should be investigated further, with a view to re-appraising the need for all students to take these subjects. In particular, I suggest that the reason for girls' weakness in these subjects should be studied further and ways sought to encourage them in these fields. These may include research into the in-school factors, such as the informal curriculum, the effect of the sex of teachers, and whether examination questions are sex-specific.

**2.3 Organise gender sensitisation programmes**

We should organise sensitisation programmes for the society to reconsider and re-think their concept of males' and females' careers and thus motivate parents to change their attitude with regard to girls' achievement in secondary education, especially in science education.

Any changes in traditional expectations, is more likely to succeed if parents understand the reason behind the change and are willing to participate. Therefore, parents should be made aware that the aim of the changes to the less positive traditional attitude is to broaden the personal, educational and vocational horizon of all pupils, where previously these have been limited by an individual's sex.

The proposed recommendations are addressed to the policy makers, but the following should also be informed accordingly. These include, teachers in the making, industrialists, and any institutions or organisations which might be interested in promoting practical work in science education. The government, in particular should encourage and promote the writing of science textbooks by local scholars to replace or supplement those originating in the Western countries, which in some cases, do not reflect pupils' real experience.

**2.4 Affecting women in positions of authority**

Besides, government leaders need to ensure that equal opportunities are represented in areas of responsibility within a school level. For example, in all secondary schools that I have visited, I have not met a single female director or a deputy director. I am of the view also that students in these schools are observing that all those who are in the administration or position of responsibility are only males. Some posts and duties of male and female teachers should be reviewed, in view of their likely impact on children, and measures should be taken to appoint some women in management posts in secondary schools. It is important that this position receives the same recognition as other areas of responsibility.

## 2.5 Sharing of household and parenting tasks

Moreover, I feel that it is to the advantage of both boys and girls, that a more realistic picture of the world is offered. Therefore, there needs to be room within the formal curriculum at all levels, for discussion about the changing pattern of women's live, the changing roles for men in parenting and house hold responsibilities. Courses should prepare girls and boys equally for shared household and parenting task, as well as provide basic living skills, such as cooking, managing money.

## 2.6 Recommendations to the University of Asmara

The University of Asmara has introduced a lower quota system for the female candidates from the different Eritrean secondary schools and for (male and female) Eritrean students, who came from the Middle East countries. The University gives special assistance to the latter, but does nothing for the local girls it has allowed to enter. These girls are made to enter the University, but immediately put next to those who passed with higher GPA and are made to compete with them, without any assistance. As a consequence, by the end of the first semester, most, if not all, are dismissed from the University, very frustrated. My argument is that such girls are in need of special assistance, hence, they should be given help at least for one or two semesters, before they are placed to compete with the rest of the student population. Otherwise, there is no point in allowing them to enter the University, to build high hopes, which will be crashed prematurely. Another recommendation to the university is provision of special assistance to girls studying science at the University.

## 2.7 Recommendations to the policy makers

I would like to recommend that education authorities look into the opening of different and diverse schools. These may include: opening up of more private schools, side by side with the state schools, to create enthusiasm and competition. Another important recommendation is the consideration of opening properly equipped girls' secondary schools for those who want it.

In chapter three it was indicated that both pupils and parents showed their concern about the pupils' summer work programme, hence it would be good to consider their views and conduct a study to find out how best to implement it.

## *3. Further actions to be taken*

### 3.1 Recommendations in the form of summary

- *Offer and strengthen pre-university entry science courses. (This will help to bridge the school and the University.*
- *Contextualise or link science to everyday life and the experience that students are likely to have.*
- *Probe deeper scale study of the learning/teaching difficulties of science in order to improve the performance of the learners.*
- *Foster partnership between parents/guardians and teachers, so that opportunities are created for the students' (girls) learning.*
- *Help to set high expectations for everyone.*
- *Ensure the provision of adequate science laboratory resources and use them effectively.*
- *Pay careful attention to establishing firm linkage between teachers, parents and school development.*

### 3.2. Recommendations for further research

- *Conduct research and re-assess the needs.*
- *Find out the composition of the science teaching force in Eritrea.*
- *Investigate student's perceptions of and attitudes towards science.*
- *Study the nature of barriers and benefits of educating females in Eritrea.*
- *Explore the expectations and experiences of first-year university students.*

#### *3.2.1 Science curriculum and teaching*

- *There is urgent need for proper supply of science teaching/learning tools e.g. text books and science laboratory equipment.*
- *The money used for the summer work programme could be spent on buying science laboratory equipment and textbooks.*
- *There is a need to form a national organisation of science teachers to be able to discuss problems pertaining to curriculum theory and practice.*
- *Revisit science curriculum with aim of making it gender sensitive, (i.e. making both sexes relate it to themselves and the world they live in and making it girl friendly so as to attract more girls.)*

#### *3.2.2 Science teachers*

- *The teachers' conditions of service be improved, and equated to their counterparts in the civil service and the private sectors.*
- *Reduce teacher's workload and supply better teaching tools.*
- *Recreate and organise pre-service teacher training package with the aim of making teacher trainers more gender sensitive.*
- *Offer in-service training to teachers on gender issues and on pedagogical approaches that are girl friendly to address gender issues in science teaching strategies.*
- *Encourage teachers to vary pedagogical approaches to meet the learning styles of both male and female students in the classrooms.*

### *3.3.3 Gender issues*

- *Address the problem (girls' underachievement in science) sooner rather than later.*
- *Adopt strategies such as the ones listed below in the hope of bringing the gender gap in achievement:*
- *Introduce effective career guidelines correctly, programmes to sensitise and educate girls concerning career opportunities.*
- *Give publicity to the few female science role models within the society.*
- *Promote a vision of gender equality in theory and in practice.*
- *Establish a policy designed to; a) encourage to enter graduate and undergraduate studies in science; b) create a more equal division of professional positions between the genders.*
- *Provide intensive and sustained professional development on gender-related matter to all staff.*
- *Establish gender responsive school management.*
- *Empower girls for effective participation in the teaching/learning process.*
- *Learn from the experience of other countries from within and outside Africa, e.g. form Kenya's and Tanzania's Centres for Excellence-created by Forum of African Women Educationists (FAWE) and Caribbean countries.*

Up to this point the discussion focused on the recommendations on how to tackle some of the problems concerning gender and educational attainment, but the next sections will take us to the study's contributions, its strengths and weaknesses.

## *4. Research contribution*

To the best of my knowledge there is only one ethnographic, gender related study (Ogbay: 1999), conducted on a group of Eritrean secondary school pupils from Asmara. Therefore, this is one of the first studies of its kind, which sets out to investigate Eritrean girls' situation as presented by the Eritrean pupils, undergraduate university students, teachers, directors and parents. Given the paucity of the studies of this kind in Eritrea, this study which could serve as a path-finder for future research, and can claim to make contributions in the following.

First, it can contribute to the literature on Gender difference in learning achievement, as seen from the Eritrean context. Second, it can contribute to an understanding of the important role that lack of motivation and encouragement can play in girls' poor educational attainment. Third, the study's findings highlight the importance of making learners, educators, parents and policy makers reflect about their duties and responsibilities towards equal educational rights of all Eritrean citizens irrespective of their sex. Fourth, it points out the overlooked assessment of Eritrean people's views, i.e.

the views of the learners, teachers and parents alike, towards the education of women in general and the achievement of girls in science in particular. Fifth, the study highlighted that girls' lack of achievement in secondary science, is caused both by the in-school and out-of-school factors. This means that both the society and the school personnel must try to change their attitude towards girls' education and give them proper encouragement to achieve better results than they are at present.

Males as well as females are responsible for perpetuating the different attainments in secondary education, therefore, they must both learn to think and act differently, if there is to be positive attainment in secondary school girls. Moreover, females must not blame males for not giving a hand in the doing the house chores, because they are accepting the situation as norm and making sacrifices and suffering alone without any resistance. My view is that they need to stand for their own rights by making the world around them know that they, too, have need to study their subjects and rest when they are tired. Moreover, it is not enough that some Eritreans express concern about girls' poor educational attainment; they must also act upon it to motivate them to study. Hence, their concerns must be accompanied with concrete facts, i.e. alleviate them from some of the burdens.

This study outcomes and recommendations will hopefully influence the national educational policies in yielding a more effective science curriculum and consequently produce more successful students in secondary schools.

### *5. Strengths and weaknesses of the study*

The strength of this study lies in the fact that a single researcher conceived and delivered the research project for the context. Being in command of both English and Tigrigna languages, my familiarity with the environment and my wide experience in the field of education, played a major contribution to the feasibility of the study and helped to overcome problems associated with some conceptual formation. However, such an extensive project for a single researcher, the absence of local literature on the issue in discussion and the time restriction in the field work, which inevitably led to only a limited amount of time being spent in each location for the empirical data collection phase. Moreover, because of the political situation of the country I could not go back for the second phase of data collection. However, due to my extensive experience of living

and working in Eritrea, this limitation was overcome to some extent. Nonetheless. the amount of data resulting from this type of research design, and the subsequent necessary analysis, was a major undertaking for a single researcher.

In summary other limitations include:

- *shortage of relevant local written material*
- *lack of classroom observation data*
- *sample size of the parents*
- *my personal biases*
- *poor co-operation from some education offices and teachers*

A key limitation of this study is that there was not enough local reference material and it does not include classroom observation. To have a first hand experience of classroom interactions between say teachers and pupils & pupils to pupils would have made the study more complete and would have given deeper and concrete information. The reason why classroom observation was not included in this study is because there was time restriction for me to remain in the field for the data collection. On the other hand, I had long experience of supervising Eritrean secondary science teaching practice, prior to my coming to Bristol for this study, thus I thought that it would not be very useful for making any generalised conclusion.

Furthermore, observational research has advantages and disadvantages, as will be explained here. The advantage is that the physical environment and the human behaviour can be recorded directly by the researcher, without having to rely on the retrospective or anticipatory accounts of others. This enables the researcher to note down what he/she sees as it occurs. Observational data are often more accurate because, the observer may be able to see what participants cannot. However, it has also limitations as a research method. The environment or the behaviour of interest may be inaccessible and observation may simply be impossible or at least difficult. Besides, people may consciously or unconsciously, change the ways they behave when they are being observed. Therefore, observational accounts of their behaviour may be inaccurate representations of how they behave naturally. Furthermore, according to Sapsford & Jupp, (1996: 59), the observations are inevitably filtered through the interpretative lens of the observer.

The next limitation consists in the sample size of the parents. Parents in this study do not represent the population, since they did not include all parents from all over the

nation; moreover they were limited in number. As they were not representative, their findings cannot be generalised to the general population, although it can indicate something parents focus on with their secondary school age children.

Yet another limitation can be my personal biases, as a researcher. Researcher's biases. are the background-experience, beliefs and attitudes, which may unconsciously affect the data, although I was aware of these factors and tried to control them. Literature on research indicates that it is not easy to remain neutral to the outcome of one's research. Furthermore, being a native Eritrean, I may fail to note and report important factors accepting them as the norms and principles of Eritrean people's every day life, when perhaps I should have questioned them. Another limitation of the study is that not all the schools and offices, where the data was collected, co-operated to the same degree.

**5.1 Limitation of survey and interview researches**

A particular method of research, which frequently appears in the educational research, is the survey approach. Survey get answers that match the questions asked, but the interpretations of the answers may be misleading without a basis for comparison. (Tuckman 1994: 12) recommends that survey be undertaken within a research design, utilising comparison groups. Tuckman's opinion is that only when properly constructed and when employed within a proper design, can questionnaire and interview approaches be used to a great advantage.

Moreover, sources of bias frequently mentioned, are the characteristics of the interviewer, of the respondent, and the substantive content of the questions. More particularly, these include:

- *the attitudes, opinions and expectations of the interviewer;*
- *the tendency for the interviewer to see the respondent in his/her own image;*
- *the tendency for the interviewer to seek answers that support his/her preconceived notions;*
- *misperceptions on the part of the interviewer of what the respondent is saying;*
- *misunderstanding on the part of the respondent of what is being asked.*

Interviewers and interviewees alike bring their own, unconscious experiential and biographical baggage with them, into the interview situation. If (Cohen et al. 2000: 121) are right, it is inevitable that researchers will have some influence on the interviewee and thereby on the data. Thus despite the employment of good planning of the project, I can not claim immunity biased opinion in the research's outcome.

## 5.2 What I would do different if I had to do similar work again

Observing the type of answers I obtained from the interviews and the questionnaires of the pupils, I would use only interviews instead of the survey questionnaires, as I did with this study. I would not interview teachers, who filled in the questionnaires, or I would ask them different questions, rather than repeating similar questions to the questionnaires. I would involve more parents than I did with this research, but above all I would interview the parents who have secondary education and above, rather than limiting their contribution just to the questionnaire responses.

The reasons why I suggest that I would do differently are:

- *Probably because pupils did not understand the scope of the research, as I have explained it in chapter five, they provided me with different responses to similar questions presented in the interviews.*

- *I used very similar questions both in the questionnaires and the interviews with the teachers and obtained the same responses, as explained in chapter seven.*

- *The parents included in this study are too few and not representative of all the parents' population, since most Eritrean parents do not have the type of education that most of the participants in this study had. Above all, these parents were not randomly selected; they were selected by the schools for the reasons explained in chapter eight.*

- *Moreover, I would not collect as much data as I did with this one, because it took me too long to assemble and transcribe it, but above all because it took me too much time to reorganise and select the ideas which seemed relevant to the research questions. I realised that all this trouble could have been avoided if I had taken more time to work further on the more relevant questions before collecting the data. However, the main reason for rushing to do that, was the political tension in the country at the time.*

Education in the contemporary context, according to (Muya 1996: 56) must be transformative, it must liberate all human kind and empower both genders through teaching them to advance their own development. All this can take place within the context of a democratic school culture, which replaces the stereotypical thinking by critical thinking, creativity and flexibility.

If there is a wish to seriously improve the achievement of girls in the sciences, all those points noted in this thesis and many other self-perpetuating problems must be tackled. To help bring improvement, (Whyte 1984: 21) believes that the recommendations that follow, if acted upon, could bring about a considerable change for the better. The actions recommended range from small practical steps by individual teachers in schools

to major policy changes in national educational strategy. My view is that individuals can achieve some improvement, but major changes need the concentrated efforts of many. Furthermore, girls could be much encouraged if greater value was placed on things they do well.

## *6. Conclusion*

My conclusion is that the country can no longer afford to ignore the considerable evidence that suggests the difficulty girls' experience in attaining success in all science subjects, but particularly in physical science. The extent and intellectual demand of physical science examination courses must be reviewed and adjusted. The final analysis is that girls' under-representation in science is due to girls' lack of motivation to achieve in their education and the lack of time to study, which is mainly caused by parental attitudes, societal poor expectation, the nature of the science courses and teaching strategies.

The problems of girls' lack of achievement in science cannot wait. It is urgent, hence, it must be addressed urgently. The nation at large and the parents in particular, can no longer ignore such a major problem. Moreover, the country is in need of future scientists to transform the nation. But if the majority of its secondary school pupils are not learning their science subjects appropriately and continuing to fail at the rate that they are, then it is the nation which is failing, because the youth are its present and future resources.

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## *Appencices*

Appendix 1 = map of Eritrea

Appendix 2 = questionnaires and interviews

Appendix 3 = letters from the Minister of Education

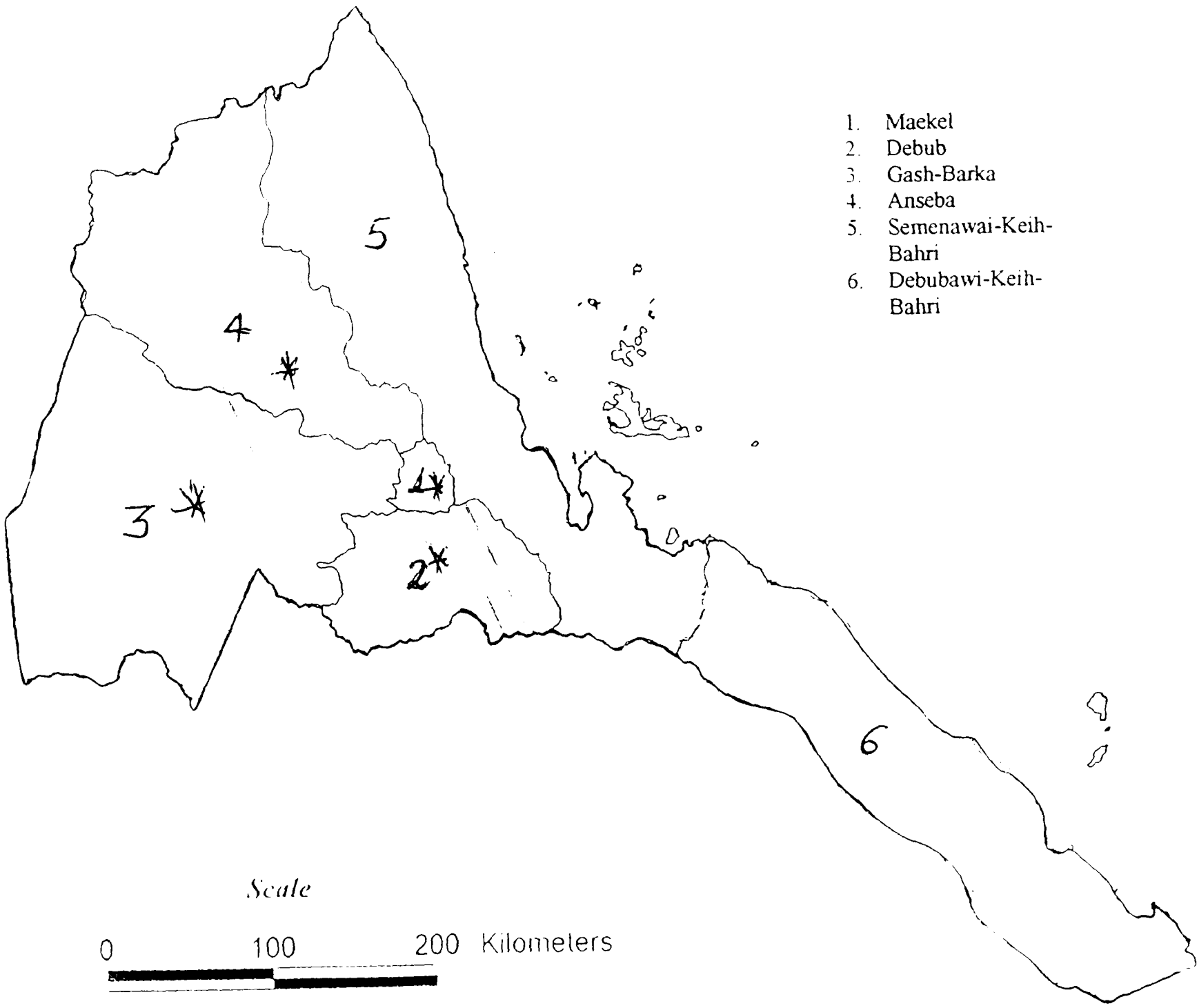
Appendix 4 = regulation concerning students discipline

Appendix 5 = science exam records

Appendix 6 = Sewit's comic strip

APPENDIX 1

# MAP OF ERITREA SHOWING ADMINISTRATIVE ZONES




1. Maekel
2. Debub
3. Gash-Barka
4. Anseba
5. Semenawai-Keih-Bahri
6. Debubawi-Keih-Bahri

***Appendix 2***

# DIRECTOR'S QUESTIONNAIRE

*I am conducting a research to determine the factors affecting secondary school boys and girls differences in achievement in the area of science. Your school has been selected to take part in the study and I kindly request your valuable assistance. There are a number of questions to be answered, please complete them in as much detail as you possibly can, using your experience, as a director.*

*Although this study has the support of the Ministry of Education, the topic is nevertheless sensitive, therefore I guarantee that your responses will be treated with strict confidentiality. Neither your name nor your school will be identified or disclosed to other persons. I will be the only one to analyse the data.*

***Thank you very much for taking the time to respond these questionnaires!***

*Yours sincerely,*

*Signature* _____

## Section "A" Director's work related experience

-Date: _____

-School's name : _____

- Town _____

-Area of specialisation: (qualification) _____

| **Work experience** | **Duration** |
|---|---|
| Teacher | _____ |
| Unit teacher | _____ |
| Home room teacher | _____ |
| Head of department | _____ |
| School director | _____ |

Other (specify) _____

## Section "B" Information about the school

-What is the student population? _____

-What is the teacher pupil ratio? _____

-What is the category of the school (boarding or day?) _____

-How many teachers are there? ___ (males ___ females ___ )

-Name at least four educational resources that you have in your school, e.g. teaching aids such as: a TV set, overhead projector, laboratory etc.

_____

_____

**Please fill in:**

1. Students' enrolment **(1999/2000)**

| Grade | Enrolled | | Drop-out | | Total | |
|---|---|---|---|---|---|---|
| | male | female | male | female | male | female |
| 8th | | | | | | |
| 9th | | | | | | |
| 10th | | | | | | |
| 11th | | | | | | |
| Total | | | | | | |

2. Students' enrolment (**1998/99**)

| Grade | Enrolled | | Passed | | Retained | | Drop-out | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | male | female | male | female | male | female | male | female | male | female |
| 8th | | | | | | | | | | |
| 9th | | | | | | | | | | |
| 10th | | | | | | | | | | |
| 11th | | | | | | | | | | |
| Total | | | | | | | | | | |

3. Students' enrolment (**1997/1998**)

| Grade | Enrolled | | Passed | | Retained | | Drop-out | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | male | female | male | female | male | female | male | female | male | female |
| 8th | | | | | | | | | | |
| 9th | | | | | | | | | | |
| 10th | | | | | | | | | | |
| 11th | | | | | | | | | | |
| Total | | | | | | | | | | |

4. Students' enrolment (**1996/1997**)

| Grade | Enrolled | | Passed | | Retained | | Drop-out | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | male | female | male | female | male | female | male | female | male | female |
| 8th | | | | | | | | | | |
| 9th | | | | | | | | | | |
| 10th | | | | | | | | | | |
| 11th | | | | | | | | | | |
| Total | | | | | | | | | | |

5. Number of teachers

| | 1996/1997 | 1997/1998 | 1998/1999 | 1999/2000 |
|---|---|---|---|---|
| Males | | | | |
| Females | | | | |
| Total | | | | |

***For the following questions please choose the correct answer by ticking in the appropriate box (✓) and complete the questions where required.***

1. In general how would you describe your school?

a. under utilised ☐ b. over utilised ☐ c. neither ☐

If it is either 'under' or 'over utilised', please suggest why that is.

_____

_____

_____

2. Is there a difference in academic performance between the children of formally educated parents and those who are not?

a. Yes ☐ b. No ☐

If your answer is 'yes', could you state why that is?

_____

_____

_____

3. What subjects do most students seem to find difficult to learn and why?

_____

_____

_____

4. Do teachers get in service workshops on how to teach and assess science subjects?

a. Yes ☐ b. No☐

5. If your answer to the above is 'yes', has teaching of science improved as a consequence of the in service workshops?

a. Yes ☐ b. No ☐

## Section "C" Gender and Education

1. Do you think that boys and girls have the same opportunities to learn well all their subjects? a. Yes ☐ b. No ☐

2. Are boys and girls getting similar grades for all the subjects?

a. Yes ☐ b. No ☐

If your answer is 'no', can you state why that is?

_____

_____

_____

3. Do you think that boys and girls differ in their intellectual abilities?

a. Yes ☐ b. No ☐

If your answer is 'no', why do you think they are getting different grades in science?

_____

_____

_____

_____

4. Would you say that science teaching is more suitable to boys ways of learning, more than that of girls?

a. Yes ☐ b. No ☐

## Section "D" Secondary school science curriculum

***Please tick ✓ the right answer and complete the questions where required***

1. Do you think that the current science curriculum fulfils the needs of the secondary school boys and girls? a. Yes □ b. No □

2. Comparing the present science curriculum with what was taught when you were a student in secondary school, do you find any difference?

a. Yes □ b. No □

If your answer is 'yes', describe the difference briefly.

_____

_____

_____

***For the following question, please tick the phrase with which you agree.***

3. Today's science curriculum is:

a. above the students level □

b. below the students level □

c. too complex □

d. appropriate for the students' level □

4. Please add any additional comment you might wish to make.

_____

_____

_____

_____

_____

_____

***Thank you very much for participating in this exercise!***

## *Parents' Questionnaire*

*Dear parent,*

*I am conducting a research to determine the factors affecting secondary school boys and girls difference in achievement especially in the area of science. You have been selected to take part in this study because of your level of education and I kindly request your valuable contribution to this study. There are questions to be answered please complete them in as much detail as possible using your experience as a parent.*

*Although this study has the support of the Ministry of Education, the topic is nevertheless sensitive, therefore* ***confidentiality is guaranteed****.*
*That is neither yours nor your child's name will be identified or disclosed to any one else, I will be the only one to analyse this data.*

***Directions on how to respond the questions***

*There are multiple choice and open-ended questions.*

*** For the multiple-choice questions, just select the right letters by ticking (✓) in the appropriate boxes.*

*** For the open-ended questions, which require writing in sentences, you may find it easier responding in* ***Tigrigna or Arabic****. But if you prefer answering your questions in English, you may do so. Choose the one language, which is easier for you.*

***Thank you very much for your co-operation!***

*Yours sincerely*

*Signature:* _____

## Parents' Questionnaire

- Date: _____
- Town of residence: _____
- Sex: Male ____ Female _____
- When did you complete your education?

Elementary: 19 . . . .

Junior (middle): 19 . . . .

Secondary: 19 . . . .

Other: 19 . . . .

If you are employed, what do you do? _____

***For question number one please fill in the blank spaces***

1. How many of your children are secondary school? _____

(Males ___ Females ___ )

*For the following questions please choose the answers* ***by ticking ( ✓)*** *in the appropriate boxes and respond the questions where required.*

2. Do you have problems sending your children through secondary school?

a. yes □ b. no □

If your answer is 'yes', please state what they are.

a. _____

b. _____

c. _____

d. _____

3. Comparing the present science curriculum with your secondary school days, do you notice any difference?

a) Yes □ b)No □

If your answer to the above is 'yes', state what the differences are.

_____

_____

_____

_____

4. Some parents say that schools are failing to perform their jobs; do you share this view?

a. yes ☐ b. no ☐ Why is that?

_____

_____

_____

_____

5. Are you satisfied with the quality of secondary school science education your children are receiving?

a. yes ☐ b. no ☐

If your answer is 'no', please state the reasons why.

_____

_____

_____

_____

6. Are your children given home-work by their teachers?

a. yes ☐ b. no ☐

7. Do your children bring home-work after school?

a. yes ☐ b. no ☐

If your answer is yes, how many times per week is that? _____

8. Do your children discuss their home-work with you?

a) yes always ☐ b)Yes, 2-3 days a week ☐ c) no ☐

9. Do your children ever get help with the difficult subjects from you?

a)Yes ☐ b) No ☐

10. Is there some one (tutor), helping your children with the difficult subjects?

a) Yes ☐ b) No ☐ Why?

_____

_____

_____

11. Do you think that children are getting too much home-work these days?

a) yes ☐ b) no ☐

12. Below are statements about ***home- work assignments***. For each item please tick (✓) a number on the four point scale.

***I = strongly agree*** ***II = agree*** ***III = disagree*** ***IV = strongly disagree***

| ***Statement*** | I | II | III | IV |
|---|---|---|---|---|
| a. homework is an important part of school work | ☐ | ☐ | ☐ | ☐ |
| b. parents should make sure their children do their homework | ☐ | ☐ | ☐ | ☐ |
| c. it is teachers' duty to see that children do their homework | ☐ | ☐ | ☐ | ☐ |
| d. children have too little homework these days | ☐ | ☐ | ☐ | ☐ |
| e. girls do not have enough time to do homework | ☐ | ☐ | ☐ | ☐ |

13. Do your secondary school age children help in the house?

a. Yes ☐ b. No ☐

14. ( **I** ) If your answer to the above is 'yes', do boys or girls spend more time helping?

a. boys ☐ b. girls ☐

( **II**) What tasks do they do?

a. _____ c. _____

b. _____ d. _____

15. Do you think that boys and girls have the same intellectual abilities?

a)Yes ☐ b) No ☐

16. ( **I** ) Comparing the results of your children, are boys and girls getting similar grades in science?

a)Yes ☐ b) No ☐

( **II** ) If your answer to the above is 'no', are boys or girls getting better grades?

a. boys ☐ b. girls ☐ Could you please state why that is?

_____

_____

_____

18. Do you give equal encouragement and time to study to your children i.e. to both boys and girls?

a)Yes ☐ b) No ☐

19. Does the Eritrean society encourage both boys and girls to equally achieve in science education?

a)Yes ☐ b) No ☐

( **I** ) If your answer is 'yes', what does the society do or say to encourage both boys and girls achievement in education.

_____

_____

( **II** ) If your answer is 'no', what does the society do or say to discourage either boys or girls not to achieve in education?

_____

_____

20. Do you feel there is girls' discrimination in the secondary school (where your children go to)?

a. yes ☐ b. no ☐

21. Do you think that teachers are less tolerant to boys' academic weakness in the science subjects?

a. yes ☐ b. no ☐

22. Do you believe that teachers are less tolerant to girls' misbehaviour in the school?

a. yes ☐ b. no ☐

23. Do you think that teachers are usually more accepting girls' academic weakness especially in the area of science?

a. yes ☐ b. no ☐

24. Would you say that Eritrean society has a stereotypical attitude towards girls' achievement in science?

a. yes ☐ b. no ☐

25. Do you think that teachers involuntarily and unknowingly, become instrument of a stereotypical conformity concerning girls' achievement in science?

a. yes ☐ b. no ☐

26. Please add any other view that you might wish to make.

---

***Thank you very much for completing the questionnaire!***

## *Teachers' Questionnaire*

*Dear teacher,*

*Ours is a wonderful profession, and the vast majority of the Eritrean educators that I know are dedicated professionals performing remarkably well, especially given the constraints under which you are currently working, yet criticism of our work abounds from several sources. Despite all that, know that change is in the air, therefore let our focus be on the future we are helping to bring, remembering that part of the unknown future is the role and responsibility of us educators as a whole.*

*I am conducting a study to determine the factors affecting secondary school boys and girls differences in achievement in the area of science. Your school has been selected to take part in this study and I kindly request your valuable assistance. There are a number of questions to be answered, please complete them in as much detail as possible using your experience as a teacher.*

*Although this study has the support of the Ministry of Education, the topic is nevertheless sensitive, therefore* ***confidentiality is guaranteed****.*
*That is neither your name nor your school will be identified or disclosed to any one else, I will be the only one to analyse the data.*

***Direction on how to respond the questions***

*** For the Multiple choice questions, just select the right letters by ticking (✓) in the appropriate boxes*

*** For the open-ended questions, which require writing in sentences, you may find them easier responding in* ***Tigrigna or Arabic****. But if you prefer answering in English, you may do so. Choose the one language, which is easier for you.*

***Thank you very much for your co-operation!***

*Yours sincerely*

*Signature:* _____

## Teachers' Questionnaire

- Date _____
- School's name _____
- Town _____
- Sex : male ___ female ___
- Area of specialisation (qualification) _____
- The subjects you are teaching now _____
- Number of periods you are teaching: weekly _____
- Average number of pupils per section (class) _____ {males ___ females ___ }
- Number of years in the teaching field _____
- The years you were a student in secondary schools:

  a) 1950s □ b)1960s □ c) 1970s □ d) 1980s □

## Section 'A' General Observation

***Please select the correct answer by ticking (✓) in the right box and complete the questions where needed.***

1. Do you encounter major discipline problems in school?

   a) yes □ b) no □

   If your answer is 'yes', what type of problems are they?

_____

_____

_____

2. If your answer to question number one is 'yes', are the students causing the discipline problems also having difficulty learning their subjects?

   a) yes □ b) no □

3. Are boys or girls causing more discipline problems?

a) boys ☐ b) girls ☐ Why is that?

4. How do you react when **boys** cause discipline problems?

5. How do you react when **girls** cause discipline problems?

6. Is there any improvement in your pupils' achievement in the last 3-4 years?

a) yes ☐ b) no ☐

If your answer is 'yes', what do you think are the major factors?

7. What subjects do most pupils seem to find difficult to learn and why?

## Section 'B' Teaching/ learning process

Please choose the right answers and respond the questions where required.

1. Are pupils given opportunities to ask questions in class?

a) yes □ b) no □

2. If your answer to the question above is 'yes', are boys or girls asking more questions?

a) boys □ b) girls □ Why is that?

_____

_____

_____

3. When you ask questions, do many of your pupils try to respond?

a) yes □ b) no □

If your answer is 'yes', are boys or girls responding more to your questions and why?

_____

_____

_____

4. What aspects of the school affects your teaching most:

a) positively?

_____

_____

_____

b) negatively?

_____

_____

_____

**5.** Below are statements about ***home work-assignments***, *by ticking* **(✓)** in *the appropriate boxes, indicate your degree of agreement or disagreement with each of them.*

I = strongly agree  II = agree  III = disagree  IV = strongly disagree

| *Statement* | I | II | III | IV |
|---|---|---|---|---|
| a. homework is an important part of school work | ☐ | ☐ | ☐ | ☐ |
| b. parents have a duty to help their children with homework | ☐ | ☐ | ☐ | ☐ |
| c. parents should make sure their children do their homework | ☐ | ☐ | ☐ | ☐ |
| d. girls do not have enough time to do homework | ☐ | ☐ | ☐ | ☐ |

## Section "C" The Current Science curriculum

***Please tick ✓ the right answer and complete the questions where required***

1. Do you think that the current science curriculum is ***relevant and applicable*** to the lives of the secondary school pupils?

   a. Yes ☐  b. No ☐

If your answer is 'no', which subject is least relevant and why?

_____

_____

_____

2. Do you think the current science curriculum is sufficient for the secondary school pupils' needs?

a. Yes ☐  b. No ☐

3. Comparing the present science curriculum with your secondary school days, do you find any difference?

   a. Yes ☐  b. No ☐

   If your answer to the above is 'yes', describe the difference briefly.

_____

_____

***Please tick the right phrase***

4. Today's science curriculum is:

a. above the students level of comprehension □

b. below the students level of comprehension □

c. too complex □

d. appropriate for the students' level □

5. Do you get periodical in service training workshops on how to best teach science and assess your pupils? a) yes □ b) no □

If your answer is 'yes', every how long does this take place?

_____

_____

6. Has science teaching improved as a result of the in-service workshops in the last 3-4 years?

a) yes □ b) no □

## Section "D" Gender and education

***For the following questions, please tick the right answers, and respond to the questions as required.***

1. Do you think that boys and girls differ in their intellectual abilities?

a) yes □ b) no □

2. Do you find achievement disparity between boys and girls?

a) yes □ b) no □

If your answer is 'yes', which group is performing better and why?

_____

_____

3. Do you think that boys and girls differ in their learning style?

a) yes ☐ b) no ☐

If your answer is 'yes', please share your view.

a. _____

b. _____

c. _____

d. _____

4. Do you feel that the masculine image of science and technology exclude girls away from learning it?

a) yes ☐ b) no ☐

5. Does the Eritrean society ***encourage*** and ***give equal opportunities*** to both boys and girls to succeed in their secondary education? a) yes ☐ b) no ☐

i. If your answer is 'yes', what does it say or do to encourage them equally.

_____

_____

_____

ii. If your answer is 'no', what does it say or do to discourage either boys or girls from achieving?

_____

_____

_____

5. Are boys and girls treated equally in your classroom?

a) yes ☐ b) no ☐

If your answer is 'yes', what specifically do you do to maintain that?

_____

_____

_____

_____

6. Do you get better performance from children of formally educated parents?

a) yes ☐ b) no ☐

**Below are phrases concerning secondary *school age boys and girls*, please tick the ones with which you agree.**

**7. Girls** usually drop out of science as it gets harder, because they:

*a) have low intellectual ability ☐*

b) lack the motivation to succeed ☐

c) lack time to study ☐

**8. Boys** usually drop out of science as it gets harder, because they:

a) have low intellectual ability ☐

b) lack the motivation to succeed ☐

c) lack time to study ☐

## Section "D" Evaluation and Assessment

***For the following questions please fill the blank spaces, tick the right answers, and respond the questions where required.***

1. If you give different activities to test your pupils' ability, what percent of the total assessment is used on:

a. Class work _____

b. Home work _____

c. Exam work _____

2. Are pupils given (individual and / or group) project works?

a) yes ☐ b) no ☐

If your answer is 'yes', how frequently does that take place?

3. What type of written tests (or exams) do you mostly set for your pupils?

a) essay type □ b) multiple choice type □

4. Please add **any other view** or **comment** you think are important

***Thank you very much for taking the time to respond these questionnaires!***

## *Pupils' Questionnaire*

***Important notes***

*Dear participant,*

*I am conducting a study to determine the factors affecting secondary school boys and girls differences in achievement in the area of science. You have been selected to take part in the study, please read each question carefully and answer honestly.*

*Your co-operation in this research is very important and the information you give* ***will be treated with strict confidentiality****. That is, it will be used for this research alone and neither your name nor your school will be identified or disclosed to any one else.*

*Direction on how to respond the questions*

***There are multiple choice and open-ended questions.***

***** For the multiple-choice questions, just select the right letters by ticking (✓) in the appropriate boxes.***

***** For the open-ended questions, which require writing in sentences, you may find it easier responding*** *in Tigrigna or Arabic.* ***But if you prefer answering in English, you may do so. Choose the one language, which is easier for you, but remember*** *it is important that your responses are honest and your points clearly stated.*

***Thank you very much for your co-operation!***

## Pupils' Questionnaire

Date: _____

School's name : _____

Town _____

Grade and section: _____

Sex: Male ☐ Female ☐

Age: a) 14 years ☐ b) 15 years ☐ c) 16 years ☐

d) 17 years ☐ e) 18 years and above ☐

### *Section "A" General Information*

1. What would you like to do (**in the future**) when you complete secondary education?

***Please choose only <u>one</u> answer by circling the letter and completing the sentence against it.***

**When I complete secondary education, I would like to:**

a. go to the university and then . . . . . .

b. go to a nursing school and then . . . . . .

c. go to the TTI and then . . . . . .. . . .

d. get a job as a . . . . . .

e. stay at home and . . . . . .

f. **add your own** . . . . . .. . . . . .. .. . .

*NB: For the following questions, depending on your gender, choose (✓) either (I) or (II)*

**2. (I)** If you are a **boy,** what level of education would you like your future **wife** to have?

a) elementary school ☐ b) Secondary school ☐

c) TTI □ d) University □ e) I Don't mind □

2. **(II)** If you are a **girl**, what level of education would you like your future **husband** to have?

a) elementary school □ b) Secondary school □

c) TTI □ d) University □ e) I Don't mind □

3. Below are some general statements ***about your school***. **Please, *read them carefully*** and by ticking (✓) in the right box, show how much you agree or disagree with each sentence.

| **Statement : My school** | ***strongly agree*** | ***Agree*** | ***disagree*** | ***strongly disagree*** |
|---|---|---|---|---|
| a- is nice and beautiful | □ | □ | □ | □ |
| b- has good rules and regulations | □ | □ | □ | □ |
| c- does not have the facilities I need such as labs, libraries etc. | □ | □ | □ | □ |
| d- is a good place to study | □ | □ | □ | □ |
| e- is always noisy, I can't concentrate in class | □ | □ | □ | □ |
| f- does not provide us with good learning atmosphere | □ | □ | □ | □ |
| g. **add your own** | | | | |

## *Section "B" Your home environment*

**For the following questions, please select the right answer by ticking (✓) in the appropriate box.**

1. How far is your school from your home?

a) less than 3 kms. □ b) 3-6 kms. □ c) 7-12 kms. □

d) more than 13 kms □

2. How do you get to school from home?

a) I walk ☐ b) by bicycle ☐ c) by bus ☐ d) by car ☐

3. What **level of formal education** did your ***father*** have?

a) none at all ☐ b) elementary ☐ c) junior ☐

d) secondary school ☐ e) university ☐

4. What **level of formal education** did you ***mother*** have?

a) none at all ☐ b) elementary ☐ c) junior ☐

d) secondary school ☐ e) university ☐

5. What is your **fathers'** occupation? Or (Where does he work?)

_____

6. Is your **mother** employed?

a) yes ☐ b) no ☐

7. Has any one from your family, e.g. a brother, sister, father or mother been or is a university student?

a) yes ☐ b) no ☐

8. If your answer to the above is 'yes', does he/she assist you with your school-work?

a) yes ☐ b) no ☐

9. Do you have a private teacher helping you (at home) with the difficult subjects?

a) yes ☐ b)no ☐

10. Do you have electric light at night when you are studying?

a) yes ☐ b) no ☐

11. Do you have your own study table at home?

a) yes ☐ b) no ☐

12. Here are some statements ***about your parents***. By ticking (✓) in the appropriate box, show how much you agree or disagree with each statement.

| *Statement* | *Strongly agree* | *agree* | *disagree* | *strongly disagree* |
|---|---|---|---|---|
| 1) If I have problems in school, my parents will always be ready to help me | | | | |
| 2) My parents expect too much from me (at school) | | | | |
| 3) My parents treat me very strictly at home | | | | |
| 4) My parents don't care about my academic achievement | | | | |
| 5) My parents encourage me to do well in school | | | | |
| 6) Add your own . . . . . | | | | |

## *Section "C" Home activities*

**Please tick (✓) the right answers** ***and complete the questions.***

1. Besides doing your schoolwork, do you also help your family at home?

a) yes □ b) no □

2. If your answer to the above is 'yes', about how many hours ***per day*** do you help?

a) One hour □ b) 1-3 hours □ c) more than three hours. □

3. What tasks do you do? **Please tick (✓) the right answers**

a. Cooking □

b. carrying water □

c. cleaning the house □

d. washing clothes □

e. caring for younger children □

f. doing farm work □

h. working in wood and/or metal workshop □

i. helping in a garage □

j. **Add any other activities that you do……**

4. Do your brothers help at home?

a) yes ☐ b) no ☐ If your answer is 'yes', what do they do?

_____

_____

_____

5. Do your sisters help at home?

a)yes ☐ b) no ☐ If your answer is 'yes', what do they do?

_____

_____

_____

6. What time do you usually go to sleep? _____

7. About how many hours do you usually sleep? _____

8. Do you get enough time to do your school work and be able to help your family?

a) yes ☐ b) no ☐

## *Section "D" School life*

**Please tick ✓ the right answers *and complete the questions.***

1. Do you enjoy your school-work?

a) yes ☐ b) no ☐

2. If your answer to the above is 'yes', what subjects do you find ***most enjoyable*** and why?

a) Maths ☐ b) Science ☐ c) English ☐ d) Arabic ☐

**e) add your own .....**

_____

_____

3. Do you encounter difficulties in school?

a) yes ☐ b) no ☐ If your answer is 'yes', what are they?

4. Are the problems you encounter the same for all boys and girls?

a) yes ☐ b) no ☐

5. What **subject teacher**s are your **most favourite** and why?

a. Biology teacher ☐

b. Chemistry teacher ☐

c. Physics teacher ☐

6. Do you get **good grades** from your favourite teachers?

A) yes ☐ b) no ☐

7. What subjects are your ***least favourite*** and why?

8. Which **subject *teachers,*** are your ***least favourite*** and Why?

9. Do you get enough support from your teachers on the difficult subjects?

a) yes ☐ b) no ☐ If your answer is 'no' state the reasons why?

10. Are your teachers' feed-backs helping you to improve your works?

a) yes ☐ b) no ☐ Why?

_____

_____

_____

11. Are you confident that you will pass the National Examination (matric)?

a) yes ☐ b) no ☐ Why is that?

_____

_____

_____

12. Below are some statements about ***your teachers***. Please, read them ***carefully***, and by ticking (✓) in the right boxes, indicating how much you agree or disagree with each statement.

| Statement: **My teachers** | ***Strongly agree*** | ***Agree*** | ***Disagree*** | ***Strongly disagree*** |
|---|---|---|---|---|
| 1. are strict with me | ☐ | ☐ | ☐ | ☐ |
| 2. encourage me to give my own views in class | ☐ | ☐ | ☐ | ☐ |
| 3. treat me as if I am stupid | ☐ | ☐ | ☐ | ☐ |
| 4. favour boys in class | ☐ | ☐ | ☐ | ☐ |
| 5. do not tolerate girls misbehaviour in class | ☐ | ☐ | ☐ | ☐ |
| 6. my biology teacher is excellent | ☐ | ☐ | ☐ | ☐ |
| 7. my chemistry teacher is excellent | ☐ | ☐ | ☐ | ☐ |
| 8. my physics teacher is excellent | ☐ | ☐ | ☐ | ☐ |
| 9. **Add your own . . . .** | | | | |

## Section "E" Science Curriculum

*Please choose the right answers and complete the questions where required.*

1. Do you like how biology is taught?

a) yes ☐ b) no ☐ Why?

_____

_____

_____

2. Do you like how physics is taught?

a) yes ☐ b) no ☐ Why?

_____

_____

_____

3. Do you like how chemistry is taught?

a) yes ☐ b) no ☐ Why?

_____

_____

_____

4. Do you study hard to get good grades in science?

a) yes ☐ b) no ☐

If your answer is 'yes', on what subject do you spend most of you study time and why?

_____

_____

_____

5. Do your teachers notice when you are studying hard?

a) yes ☐ b) no ☐

6.a. Do you find the biology you learn in school **relevant** to your needs?

a) yes ☐ b) no ☐

6.b. Do you find the chemistry you learn in school **relevant** to your needs?

a) yes □ b) no □

6.c. Do you find the physics you learn in school **relevant** to your needs?

a) yes □ b) no □

If your answer to question 6 a-c is 'yes', which subject/subjects do you find most relevant and why?

_____

_____

_____

7. Which science subject do you find ***least relevant*** and why?

_____

_____

_____

8. Do you find the **content** of the science subjects easy to understand?

a) yes □ b) no □

9. Do you understand the **language** in your science subjects?

a) yes □ b) no □

10. If you get **passing marks** in your science subjects, is it because you are just:

a) lucky □ b) intelligent □

c) studying hard □ d) copying from friends □

11. If you get **poor grades** in science, is it because:

a) you are not studying hard enough □

b) the subjects are too difficult □

c) you are not helped enough by your teachers □

12. ***For the questions in the box please write the num*ber *of hours you spend studying each subject.***

a- How many hours per week do you spend studying biology? _____

b- How many hours per week do you spend studying physics? _____

c- How many hours per week do you spend studying chemistry? _____

***For the following, please choose the right answer and complete the questions where required***

**Keys: high = 70-60 average = 60-50 low = 50-40**

13. How are your grades in Biology? a) high ☐ b) average ☐ c) low☐

14. How are your grades in physics? a) high ☐ b) average☐ c) low☐

15. How are your grades in Chemistry? a) high ☐ b) average☐ c) low☐

16. What are your ***grades*** over all? a) high ☐ b) average ☐ c) low ☐

17. Are your science text ***books*** easy to understand? a) yes ☐ b) no ☐

18. If your answer to the above is 'no', which subject is the most difficult one to understand and why?

_____

_____

_____

19. Do you feel the amount of (weekly) time allocated for teaching science subjects to be enough?

a) yes ☐ b) no ☐

20. Do you have science laboratories in your school?

a) yes ☐ b) no ☐

21. If your answer to the above is 'yes', are your laboratories well equipped with instruments and the required chemicals?

a) yes ☐ b) no ☐,

22. Do students use the science labs?

a) yes ☐ b) no ☐

a) 23. Do you think that you are using you laboratories sufficiently? a) yes □

b) no □ If your answer is 'no', could you explain why that is?

_____

_____

_____

***Section "F" Gender and education***

**Please choose the right responses and complete the questions where required.**

1. Are students given opportunities to ask questions in class?

a)yes □ b) no □

2. If your answer to the above is 'yes', do boys or girls ask more frequently?

a) boys □ b) girls □ Why is that?

_____

_____

_____

3a. When teachers ask questions, do many students try to respond?

a) yes □ b) no □

3b. If your answer is 'yes', are boys or girls responding more frequently?

a. boys □ b. girls □ Why is that?

_____

_____

_____

4. Do your teachers give boys and girls equal chances to?

i. ask questions □

ii. respond questions □

iii. come out to the black board and work out answers □

iv. experiment in the lab, etc. □

5. Whom do your ***science*** teachers ***favour most***?

a) boys □ b) girls □ Why?

_____

_____

_____

6. Do you think that boys and girls have the ***same intellectual ability*** to learn, all the subjects taught in secondary schools?

a)yes □ b) no □

If your answer, is 'yes', how do you explain the different results obtained by the different pupils?

_____

_____

7. Are boys and girls in your class getting the same grades in science?

a) yes □ b) no □

If your answer is 'no', which group is performing better and why?

_____

_____

_____

8. Do you think that boys and girls differ in their learning style (methods)?

a)yes □ b) no □

If your answer is 'yes', what are they?

_____

_____

_____

9a. Do you think that secondary school boys and girls have the same amount of time to study?

a) yes ☐ b) no ☐

9b. If your answer is 'no', who has more time to study?

a. boys ☐ b. girls ☐

10. Do you think there is discrimination between boys and girls in schools?

a)yes ☐ b) no ☐

11a. Does the Eritrean society encourage both boys and girls to equally achieve in science?

a)yes ☐ b) no ☐

11b. If your answer is **'yes'**, what does the society say or do to encourage both boys and girls to achieve?

_____

_____

_____

11c. If your answer is **'no'**, what does the society say or do to discourage either boys or girls?

_____

_____

_____

12. **Girls** usually drop out of science **as it gets harder** because they:

a) have low intelligence/ability to succeed ☐

b) lack the ***motivation*** to succeed ☐

c) lack ***time*** to study ☐

13. **Boys** usually drop out of science **as it gets harder** because they

a. have less *intelligence*/ability to succeed ☐

b. lack ***motivation*** to succeed ☐

c. lack ***time*** to study ☐

14. Are there major discipline problems in your school?

a) yes ☐ b) no ☐

If your answer is 'yes', what type of problems are they?

15. Do the students causing discipline problems also have difficulty understanding their subjects?

a) yes ☐ b) no ☐

16. Are boys or girls causing more discipline problems?

a) boys ☐ b) girls ☐ Why is that?

17. What do teachers say or do when **boys** misbehave in class? Give a specific examples.

18. What do teachers say or do when **girls** misbehave in class? Give specific examples.

Please, Add your comments on how to improve ***science teaching and learning*** in your school.

_____

_____

_____

***Thank you very much for answering the questions.***

***University students***

*Dear student,*

*I am conducting a study to determine the factors affecting secondary school boys and girls differences in achievement in the area of science. You have been selected to take part in this study because of your major; thus your valuable assistance will be appreciated. There are a number of questions to be answered, please complete them in as much detail as possible using your experience, as a university student.*

*Your responses will be treated with strict confidentiality i.e., they will be used for this research alone and neither your name nor your individual opinion will be disclosed to other persons.*

***Direction on how to respond the questions***

*There are multiple choice and open-ended questions.*

*** For the multiple-choice questions, just select the correct letters by ticking (✓) in the appropriate boxes.*

*** For the open-ended questions, which require writing in sentences, you may find them easier responding in* ***Tigrigna or Arabic.*** *But if you prefer answering in English, you may do so. Choose the one language, which is easier for you, but remember it is important that your responses are honest and your points clearly stated.*

***Thank you very much for your co-operation!***

## University Students' Questionnaires

Date: _____

Department: _____

Sex: Male _____ Female _____

Major: _____

Year of study: _____

Your secondary school's name and town: _____

***NB: All these questions refer to your secondary school experience.***

### Section "A" General information

***Please choose the right answer by ticking (✓) in the appropriate boxs and complete the answers where required.***

1. **Paternal** educational level

a) No formal education □ b) Elementary education □

c)Secondary education □ d) 12 + □

2. **Maternal** educational level

a) No formal education □ b) Elementary education □

c)Secondary education d) 12 + □

3. Has any member of your family (e.g. father, mother, brother or sister) been a university student before you?

a) Yes □ b) No □

If your answer is 'yes', did you get help form him/her in the difficult subjects?

a) Yes □ b) No □

4. Were you encouraged to succeed in your studies by your parents or other family members when you were in secondary schools?

a) Yes □ b) No □

If your answer is 'yes', could you describe how that was implemented?

_____

_____

_____

5a. Did you get a lot of encouragement from your secondary school **science teachers** to succeed?

a) Yes □ b) No □

5b. If your response is 'yes', what did they say or do to encourage and motivate you?

_____

_____

_____

6. How far was your school from your home?

a) less than 3 km. □ b) 3-6 km. □

c) 7-13 km. □ d) more than 13 km. □

7. How did you get to the school every day?

a) I walked □ b) by bicycle □

c) by bus □ d) by car □

8a. Did you have enough time to study and do your housework?

a) Yes □ b) No □

8b. If your answer is 'no', please state the reasons.

_____

_____

9. Did you have a quiet room at home where to study and do your school work?

a) Yes □ b) No □

10. How many hours per week did you devote for studying daily? _____

11. What percent of your study time did you spend on science subjects and why?

_____

_____

12. On which subjects did you spend most of your study time?

a) chemistry □ b) biology □ c) physics □

Why is that? _____

_____

_____

13. What was your **favourite** subject and why?

_____

_____

_____

14. Did you get good grades in the national examination in **your favourite** subject?

a) Yes □ b) No □

15. What **subject teacher** was your favourite one? _____

Did you get good grades from him/her? a) Yes □ b) No □

16. Did you have some one helping you (at home) with the difficult subjects?

a) Yes □ b) No □

## Section "B" Science curriculum

1a. Did you like how your science subjects were taught in secondary school?

a) Yes □ b) No □

2b. If your answer is 'no' would you give suggestions on how the secondary school science teaching could be improved?

_____

_____

_____

_____

2. Did you find secondary school science curriculum **relevant** to your needs?

a) Yes □ b) No □

3a. Would you say that the science **content** was easy to understand?

a) Yes □ b) No □

3b. If your answer is 'no', which subjects did you find difficult and why?

_____

_____

_____

4. Did you find the **language** in your science text books easy to understand?

a) Yes □ b) No □

5a. Did you have science laboratories in your secondary school?

a) Yes □ b) No □

5b. If your answer to the above is 'yes', were the laboratories well equipped with instruments and chemicals?

a) Yes □ b) No □

6. Did you use the laboratories?

a) Yes □ b) No □

7. Do you think that you were using the laboratories sufficiently?

a) Yes □ b) No □

8. How were your science grades compared to the other subjects?

a) high □ b) average □ c) low □

9. Do you feel the weekly time table for teaching sciences was enough?

a) Yes □ b) No □ Please state your view in the space provided.

_____

_____

_____

10. If you were getting good grades in science, was it because you:

a) are intelligent □ b) studied hard □ c) got help from your teachers □

11. If the other pupils were not getting good grades, was it because they:

a) did not study hard □

b) lacked intelligence □

c) did not get enough help □

***Section "C" Gender and education***

**Please choose the right responses and complete the answers where required.**

1. Were students given opportunities to ask questions in class?

a)yes □ b) no □

2. If your answer to the above is 'yes', did boys or girls ask more questions?

a) boys □ b) girls □ Why is that?

_____

_____

_____

3a. When teachers asked questions, did many students try to respond?

a) yes □ b) no □

3b. If your answer is 'yes', did boys or girls respond to more questions and why?

a) boys □ b) girls □

_____

_____

_____

4. Did your teachers give boys and girls equal chances to:

i. ask questions □

ii. respond questions; □

iii. come out to the black board and work out answers; □

iv. experiment in the lab, etc. □

5. Whom did teachers favour in class?

a) boys □ b) girls □ Why?

_____

_____

_____

6. Do you think that boys and girls have the same intellectual ability to learn well all the subjects taught in the secondary schools?

a)yes □ b) no □

7a. Do you think that boys and girls differ in their learning style (methods)?

a)yes □ b) no □

7b. If your answer to the above is 'yes', please explain their difference?

_____

_____

_____

8. Does the Eritrean society encourage both boys and girls to equally achieve in science?

a)yes □ b) no □

( I ) If your answer to the above is 'yes', what does it say or do to encourage achievement in both boys and girls?

(II) If your answer is ' no', what does the society say or do to discourage either boys or girls?

9a. Did you observe achievement disparity between secondary school boys and girls in science?

a) yes □ b) no □

9b. If your answer is 'yes', what do you think the factors are?

10a. Were there major discipline problems in your school?

a) yes □ b) no □

10b. If your answer is 'yes', what type of problems were they?

11. Were the students causing the discipline problems also getting poor grades?

a) yes □ b) no □

12. Were boys or girls causing more discipline problems?

a) boys □ b) girls □

13. How did teachers react when **boys** caused discipline problems in class?

_____

_____

_____

14. How did your teachers react when **girls** caused discipline problems in class?

_____

_____

_____

15. What advice would you give to pupils who have difficulty learning science subjects?

_____

_____

_____

## Section "D"

## Eritrean General Certificate Examination( EGCE) (National Exams)

1. Did you pass the National Exams, the first time you took them?

a) Yes □ b) No □

2. Do you think that the national exams are appropriate for the level of the Eritrean pupils'? a) Yes □ b) No □ If your answer is 'no', state why that is.

_____

_____

_____

_____

3. Which of the following do you think are the causes for secondary school pupils failure in the national exams?

***Please tick (✓) the right answer or answers.***

a -The weakness of the parents ☐

b- The weakness of the teachers ☐

c- The weakness of the pupils themselves ☐

d- poor laboratory equipment ☐

e- Poor text books ☐

f- Difficult subjects ☐

g- all of the above ☐

**h- add your own view** _____

4. What could be done to improve the national exam results? Please give your suggestions in the space provided

_____

_____

_____

***Please add any other comments you wish to make***

_____

_____

_____

_____

_____

_____

***Thank you so much for answering the questions.***

## *Pupils' Interview Questions*

*School:* _____
*Zoba:* _____
*Grade:* _____
*Number of students:* _____ *Males:* ____ *Females* _____
*Date:* _____

***Perception of School Culture***

*1. Can you please tell me three things you **like most** (about your school)*
*2. Three things you **dislike most** about your school*
*3. If there was one thing **you could change** about this school, what would it be?*
*4. What is the **most useful** thing you are learning in school?*
*5. Tell me about the **teachers** that you particularly **like***
*6. Tell me about the **teachers** that **you don't like** so much*
*7. If a **new teacher** came to this school what would he/she have to be like to **be popular** among the students?*

***Home/ Family/ Peers***

*1- What do you do when you get home from school?*
*2- Do you talk much about your school with members of your family?*
*3- Do you talk much about school with your friends? If the answer is 'yes', what particular aspects of the school do you talk about?*

***Curriculum assessment/attainment***

*1. Is science your favourite subject?*
*2. Do you anticipate to follow a career related to science fields?*
*3. Which subject (physics, chemistry, biology) do you like most? Can you explain why? (probe for impact of relationship with the teacher on these preferences)*
*4. Are these the subjects you are particularly good at? (If the answer is 'no', ask which subjects they are particularly good at?)*
*5. What subjects do you **like least**? Why? (probe for impact on relationships with teachers).*
*6. Do you get enough feedback from your teachers?*
*7. Do the feedback help you to improve?*
*8. Are boys and girls getting the same results in science?*
*If your answer is 'no', why do you think that some pupils are getting better grades than others?*
*9. Are boys and girls treated the same way in your science classes?*
*10. What can you say about tests and examinations. Do you like/dislike doing them? (probe for perception of their importance/fairness; degree of acceptance; degree of self- confidence in undertaking the form of assessment).*
*11. What stops you from learning your subjects? i.e What makes it harder to learn?*
*12. Could you suggest ways in which science teaching can be improved in your school?*
*13. Is there any thing else that you would like to talk about which I haven't asked you?*

Science Teachers' Interview

***Date*** _____
***School*** _____
***Zoba*** _____
***Sex: Male*** _____ ***Female*** _____

***Teachers' interviews***

*1- Teachers sometimes say that they have **a really good day**. Could you tell me what a really good day would be for you?*

*2- What are the **most rewarding** aspects in being a secondary school science teacher?*

*3- What are the **least rewarding** aspects in being a secondary school science teacher?*

***Implementation of programme***

*1. When you decide to elaborate on an example, in your subject, do you make sure that it is **attractive to all the pupils** in the class, i.e. boys as well as girls,*

*2. In the presentation (or illustrations) of exercises, are you able to vary the wording,?*

*3. When you evaluate students' performance, do you make sure that neither boys nor girls have any advantage as regards a given exercise or test method due to their extra-curricular experiences, eg. games and knowledge acquired outside school?*

*4. If you note any systematic differences between boys and girls in success rates, how do you try to interpret it?*

*5. Do you think the amount of the material allocated to be taught in a school year is appropriate? If your answer is 'no', is it too little or too much?*

*6. Are you able to cover all the material at the end of the school year?*

*7. Are you satisfied how well your pupils are performing in your subject, (science)?*

**Interaction in your classroom**

*1. How is students' sitting arrangement in the classroom planned? Do they choose their own seats or it is given to them?*

*2. If students choose their own seats, who sits in the front or in the back? (The clever, dull, boys, girls etc.?) Does how they choose their seats affect you opinion of them or the attention you pay to them?*

*3. Do you know the names of all the students, and if not, whose do you know? What do you call them (Miss, Mr...)?*

*4. How do you go about letting students participate?*

*5. Do you ask different questions depending on the student (good / poor and/or girls/boys)?*

*a-Do you encourage them to respond?*
*b-How much time do you give them?*
*c-What do you do if they don't say anything?*

*6. When you have students in small groups, how are the groups composed? For example, questions such as these may follow.*

*a-You let them do it and the group end up non-controlled.*
*b-You intervene to impose a balanced gender mix or put girls and boys in competition.*
*c-What effect do these differences have on the group's?*
*d-Who leads the group?*
*e-Who takes notes?*
*f-Who helps others?*

*7. When you have them work with equipment, do you see that all the pupils (especially girls) have access?*

*8. When you assign pupils to do little jobs e.g. straightening up a lab or a classroom, do you tend to address your requests to boys or girls depending on the type of job?*

***General overview about science subjects***

*1. How long have you been teaching the course you are teaching now? Do you like it?*

*2. What can you say about the content quality of the text books you are using?*

*3. What factors affect pupils' achievement in science?*

*4. Do more boys or girls interrupt the teachers to* ***ask questions****?*

*5. Do more boys or girls interrupt* ***(disturb)*** *the class?*

*6. How would you describe the performance between boys and girls in your subject?*

*7. What messages do pupils get from their families, the school, and the society concerning the* ***secondary school science education****? Would the* ***messages the society conveys*** *have different meaning for boys and girls?*

*8. If you had a chance to choose now, would you choose to be a teacher?*

*9. Does the present secondary school national standard exam results worry you? If your answer is 'yes' would you suggest how it could be improved?*

*10. Please briefly discuss how you think secondary education in Eritrea will develop in the next five to ten years.*

*11. Is there any point you would like to raise or add?*

## *Parents' Interview Questions*

*Date:* _____

*Sex:* _____

*Place:* _____

1. *How may of your children are or went through secondary school? Are they boys or girls?*
2. *Do you have problems sending your children through the school? If your answer is 'yes', what type of problems are they?*
3. *Some parents say that schools are failing to perform their jobs, are you of the same view?*
4. *Are you satisfied with the quality of education your children are getting?*
5. *Is there some one (tutoring) helping your children at home with the difficult subjects?*
6. *Do you think that children are getting too much homework these days?*
7. *Do your secondary school age children help in the house?*
8. *Are mostly boys or girls helping in the house? Why is that?*
9. *Do you think that boys and girls have the same intellectual abilities?*
10. *Do your children (boys and girls) get the same grades in science? If your answer is 'no', state why that is?*
11. *Does Eritrean society encourage both boys and girls to equally achieve in science? ...How?*
12. *Do you give equal encouragement and time to do the school-work to both your boys and girls?*
13. *Have you noticed any discrimination against girls in the school where your children go?*
14. *Do you think that teachers are less tolerant to boys' academic weaknesses?*
15. *Do you think that teachers are more tolerant to girls' academic weaknesses?*
16. *Do you feel that Eritrean society has a stereotypical attitude towards girls' academic weaknesses?*
17. *Do you think that teachers involuntarily and unknowingly become instruments of the stereotypical conformity concerning girls' achievement in science and maths?*
18. *Is there any thing else you would like to add?*

APPENDIX 5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دولة ارتريا
وزارة التعليم


# THE STATE OF ERITREA
Ministry of Education

ዕለት Date 8/11/1999 التاريخ

ቁ፡ መዝገብ Ref. MOE/MINS/252/99 المرجع

ናብ፡-

ቤ/ት/2ይ ደረጃ ደቀምሓረ

ሰላምታ‹ና ነቕድም።

ጉዳይ፡- ምትሕብባር ምስ ሲ/ር ለተድንግል ዑቕባ ሚካኤል

ስመን አብ ላዕሊ ተጠቒሱ ዘሎ ዜጋ-ሲ/ር ለተድንግል ዑቕባሚካኤል- ሓደ ናብ ናይ 2ይ ደረጃ ዝዓለመ ናይ ስነ-ፍልጠት መጽናዕቲ ንክካይዳ መደብ ኣለወን። መጽናዕቲ ሲ/ር ለተድንግል ዑቕባሚካኤል "Secondary School Science Education" ዝብል ኮይኑ "ስለምንታይ ብሓፈሻ ተማሃሮ 2ይ ደረጃ ኣብ ስነ-ፍልጠት ይደኽሙ ስለምንታይከ ብሕልፊ ደቀ ኣንስትዮ ተማሃሮ 2ይ ደረጃ ድኻም ዘርእያ"፡ ዝብሉ ሕቶታት ኣብ ምምላስ ዘድሃቦ ክኸውን ኢዩ። ብተወሳኺ ንሰን ምስ ኣምሓደርቲ ኣ/ትምህርቲ 2ይ ደረጃ ተማሃሮ መማህራንን ወለድን ቃለ-መጠይቕ ንምክያድ መደብ ኣለወን።

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دولة ارتريا
وزارة التعليم

THE STATE OF ERITREA
Ministry of Education

ዝተ/ቑ: MOE/MINS/252/99 المرجع
Ref.

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دولة ارتريا
وزارة التعليم

THE STATE OF ERITREA
Ministry of Education

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دولة ارتريا
وزارة التعليم

THE STATE OF ERITREA
Ministry of Education

ዕለት Date 8/11/1999 التاريخ

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APPENDIX 4

# REGULATIONS CONCERNING STUDENT DISCIPLINE

Education for the Benefit of the Masses

Ministry of Education
September 1977

## Introduction

The basic aim of the Eritrean education system is to create a condition for the promotion of students' physical, mental and moral development so that they would be able to serve their people and country. The acquisition and development of desirable knowledge, skills, attitudes, moral values and creative thinking for purposes of serving country and people place a heavy responsibility on schools. This responsibility needs to be reinforced by the development of a set of guidelines.

The main concern of these guidelines is the formulation of 30 students golden rules. These rules have been formulated with a view of reinforcing student discipline in schools. They also underline the need for the development of desirable political, moral and work behaviour among students. The choice of a set of '30' rules epitomizes the 30 years of struggle and sacrifice which the people of Eritrea went through and paid in order to create a new culture based on progressive ideas and moral values.

This guideline contains basic principles and perspectives on student discipline. Its purpose is not simply to find faults but also to reinforce discipline through the reward of exemplary behaviour. The application of the regulations also takes into consideration the scale of the offences and variations in age levels

In the process of developing these regulations, relevant lessons have been drawn from past experiences. As much as possible, due consideration has also been given to the challenges and educational aspirations associated with the upbringing of new generations.

## Section 1: Title, Reference, Application and Interpretation

1.1. This guideline will hence forth be referred to as the Regulations on Students Discipline!

1.2. This document contains regulations issued by the Ministry of Education of The State of Eritrea.

1.3. These regulations shall be applied as from _____ in primary, middle and secondary schools operating within the school system of Eritrea.

## Section 2: Aims, Perspectives and Principles

### 2.1. Basic Perspectives on Student Discipline

- Education in Eritrea is aimed at fostering citizens imbued with the spirit of national unity and identity, nation building and desirable moral behaviour.

- To facilitate the development of citizens with desirable disciplinary behaviour, schools should aim at an integrative development of the learner by offering political and general education and inculcating relevant work, moral and leisure habits.

- Discipline among students should be viewed and develops as an expression of respect for classmates, parents and elders, and as a basis of care and commitment to country and people.

- The focal concern of the process of monitoring and maintaining student discipline shall be to stimulate fundamental behavioural changes among learners.

## 2. 2 Basic principles

To facilitate the attainment of the basic perspectives on student discipline mentioned above, the following principles shall be followed as part of a guiding philosophy:

- The process of maintaining discipline and stimulating behavioural change shall embrace three dimensions competition, encouragement and reward/punishment.

- Maintaining and monitoring student discipline shall involve all those concerned, including learners.

- The procedures of maintaining student discipline shall be based on clearly defined and organizational procedures.

- Disciplinary measures shall take into account the psychological condition and age level of offending students.

## 2.3. Aims of the Guidelines

These guidelines have been prepared by the Ministry of Education in order to facilitate effective learning activities and organizational practices in schools. More specifically, the aims of the guidelines are to:

- Facilitate the attainment of educational targets

- Instill a sense of shared responsibility and obligation among students.

- Assist in the development of socially desirable moral behaviour among students in and out of school situations

- Foster and reinforce the application of scientific outlook in the handling and guidance of students.

- Promote and clarify student right and obligations

- Define an organizational framework for monitoring student discipline in and out of school situations.

## Section 3: 30 Student Golden Regulations

The education rights of every student in the Eritrean school system are protected in line with government policy on equal access to educational opportunity. All the rights of children enshrined in children's World Conventions and agreed to by the Government of The State of Eritrea have been accepted as important initiatives. In general, however, students within the Eritrean school system are required to abide by the following rules:-

1. To respect and honour the national flag and anthem
2. To line up and sing the national anthem during flag raising and lowering ceremonies.
3. To work for unity and harmony, and to avoid any sectarian activity in school
4. To acquire desirable knowledge for the service of country and people
5. To conscientiously follow study plans and participate actively in class and school activities
6. To report promptly and in time for school and classroom activities
7. To refrain from conducting religious preaching or any form of religious activity/ campaign in school
8. To come to school properly dressed and with appropriate body care ( hair, nails, etc.). The use of hats/caps in school is not allowed.
9. To ensure that students come to class with the required stationery (books, exercise books, pens, pencils, etc.) and occupy his/her seat well before the arrival of the teacher
10. To line up soon after the ringing of the bell and proceed to relevant classrooms in an orderly manner.
11. To respect school guidelines and directives issued by head teachers and teachers.
12. Students are not allowed to enter, leave or move around the classroom without the permission of the teacher.
13. Students should sit on their chairs with proper body posture
14. Students should refrain from unnecessary activities and interruptions in the course of normal class work.
15. Students should raise their hands when asking or answering questions.
16. Students should keep standing when asking or answering questions
17. Students should stand up and politely offer and respond to greetings from teachers, head teachers, parents and other visitors to the class.

18. Students should deliver class and home work and other assignments in time and as directed by the teacher.
19. It is not permitted to copy or let others copy when doing individual work or assignment.
20. Every student should keep clean the school compound, and his/her classroom and seats.
21. Students should avoid anything that damages the reputation and honour of their school, head teachers or teachers. They should also refrain from making dishonourable statements.
22. Students are not allowed to chew gums, or use perfumes, Jewellery, decorations and other objects capable of distracting attention inside the classroom and within the school compound.
23. Students should look after their classmates and school property. Any form of theft or vandalism ( e.g. removal of notices smearing walls, scribbling on desks and walls) is not allowed.
24. Students should bring their parents/guardians when asked to so.
25. Students should refrain from defacing or forging certificates and some other official documents.
26. Students should avoid the use of offensive language and any form fighting or physical abuse individually or as a group.
27. Students should move about politely and in a well behaved manner in schools and public places.
28. Students should not go to drinking places or some other related areas where alcoholic beverages are served.
29. Students should not smoke cigarettes or use some other drugs. Playing cards and gambling are not allowed in any place or condition.
30. Students should respect their parents and be prepared to help their brothers and sisters. They should respect and offer their assistance to the elderly, disabled, sick and other people in need . They should also look after and support young children.

## Section 4: Conduct of Disciplinary Procedures

- Every student has the right to know and understand school rules and regulations

- Since maintaining discipline includes identifying students with exemplary behaviour, it is necessary to encourage and reward these students.

- The names of exemplary students ( both in term of discipline and work ethic) should be placed in special school records and communicated to students and the general public during parents' day.

- Students who commit offences have the right to be informed about the specific article of the golden regulation which they have breached.

- Students will be assessed for behaviour out of a total mark of 10 at the end of each semester. Any breach of a regulation will cost the student 1 mark.

- Head teachers and teachers are not in any way allowed to inflict physical punishment or verbal abuse on students.

- It is not permitted to expel a student from a class. Any student exhibiting unruly or disorderly behaviour should be given warnings until his/her case is presented for further action.

- Students have the right to obtain feedback on the assessment of their behaviour and on any development ( positive or negative) regarding social relationship in schools.

- Students should be able to hold meetings about issues of mutual concern with their class teacher once a month.

- Student complaints should be properly considered, investigated and explained at the appropriate time .

- Many students within the age range of 7-11 may inadvertently commit offences. Accordingly, the cases of each students will have to be considered with a great deal of patience, tolerance and understanding.

- Care should be taken not to impose group punishment if a group of students wouldn't respond to advice or co-operate in the identification of possible offenders, there cases should be investigated with a view of taking further disciplinary action.

- Disciplinary action taken against students should be communicated to parents and school committee members. A copy of the decision should be kept in the students' file.

## Section 5: Levels of punishment

### 5.1. Types of offence

Offence committed by students may be divided into two levels- high and low level offences. Low level offence constitute three categories where as high level offence comprises two categories.

*Low level offences*

- Inability or reluctance to accomplish set targets and work
- Reluctance to work independently on assignments
- Spreading lies and unfounded stories in school
- Damaging school property ( e.g. fences, school/class walls, desks).
- Coming late and not lining up during assembly
- Relating negatively and disorderly manner to teachers, head teachers and other school staff members.
- Tearing or defacing school notices
- Refusing to deliver messaged to parents/guardians
- Using make-up, performance, chewing gum, etc.
- Causing disruption in class and school
- Getting involved in disruptive and morally unacceptable behaviour in and out of schools situations (in clear violation of the golden regulations).
- Committing lies and other offences and refusing to disclose there (and offences committed by others) to relevant authorities.
- Getting involved in minor and coincidental fights
- Being disrespectful to elders and not obeying parental orders.

*High Level Offences*

First Category

- Jumping over the fence to enter or leave school
- Intentionally misleading school authorities by delivering official/warning letters to decoy parents/guardians
- Drinking in bars and secret hide outs

Second Category

- Committing aggressive acts with the intention of causing bodily harm
- Participating in aggressive and group based gang and unruly behaviour.
- Copying from classmates or allowing others to copy in the course of doing individual work or examinations.
- Cheating on allocated marks and forging certificates and other school documents.
- Committing any form of theft.
- Inflicting verbal and physical abuse on teachers, head teachers and other staff members.
- Drinking alcoholic beverage and causing disruptive behaviours
- Coming to school drunk
- Inciting any form of discrimination and sectarian divisions
- Disrespecting the national flag and anthem

## 5.2. Management of Offences

- Offences committed by primary school children ( age range 7-11) should be dealt within the framework of minor/ low level offences and in accordance with their age levels. Offences committed by children with abnormal behaviour should be handled according to special provisions.

- On this basis offences committed by young children will be placed within the parameter of Category 1. If this is not appropriate, such offences could be placed under category 2 and 3. An offence committed by under 11 year old children will not be considered a major breach of school regulations.

- Students who commit offences three times within the parameter of Category 3 shall be considered to have committed a major offences.

- A student damaging or losing school property will be required to repair or replace it. If he/she shall be considered to have committed a major offence.

## 5.3. Procedures for Taking Disciplinary Measures

- Appropriate measures will be taken against any form of student offence

- These measures include advice, caution, work in the school compound, expulsion from student associations and club/groups, losing points from the cumulative marks allocated to conduct, as well as suspension and expulsion from school.

- Punishment for low level offences shall be conducted along the following procedures:-

  - Any student committing a low level offence for the first time will have his/her case considered within the framework of category 1 Offences. Such a student will be cautioned, given advice and the case recorded in his/her personal file.

  - Any student committing a low level offence for the second time will, upon evaluation of the consequences of the offence, be required to call his/her parent or guardian. The student and his/her parent or guardian will be asked to sign on a special disciplinary form (No. 2). In addition, a substantial work based punishment compatible with his/her age level will be imposed. Further more, the student will lose 1 point

from his/her total score for behaviour and will forfeit the right to participate in school associations and clubs/group activities.

- A student who does not show noticeable improvement after Low level Category 3 punishments will have his/her case considered within the parameter of High Level offences

## Section 6: Application

### 6.1. Procedures in Decision Making

- Maintaining and monitoring discipline is the responsibility of all teachers.
- Teachers' reports on students offences should be presented to the head teacher for necessary action
- The head teacher upon reviewing the report by the class teacher shall take a decision in accordance with relevant articles in the regulations.
- When appropriate the head teacher may form an ad-hoc committee to review reports on disciplinary within a set deadline.
- The head teacher is required to ensure that the disciplinary regulations (in both in-school and 2 out-of-school contexts) are explained to teachers, students, staff members and parents.
- Cases of student offence shall be properly documented and recorded in school files

### 6.2. Allocation of marks for Behaviour

- Every student shall be graded for behaviour out of a total score of 10 marks.
- The students' marks for behaviour should be clearly recorded as part of the general learner assessment at the end of each semester. This should also be available to parents.
- Second and Third Category Minor Offences will cost the student one point each from the total mark for behaviour.
- On this basis, any student who scores of or less on the behaviour scale will (upon review of the weight of the offence) be liable to suspension or expulsion from school.

## 6.3. Disciplinary Forms

### *1st Level offence Form*

| Date | Name | Sex | Age | Efforts mode to improve Discipline | | | | Signature | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Advice | | Reprimand or Punishment | | Head | Student |
| | | | | Date | Case | Date | Case | | |
| | | | | | | | | | |

### *2nd Level offence Form ( subsequent to advice and two warnings)*

This form is applicable to students who have repeatedly committed offences. Prior to a final decision, the concerned student (in the presence of his/her parents or guardians) should complete and sign this form.

Date _____

Name of school _____

I_____who is a student in class_____admit to have breached Article_____of the Golden Regulations by_____.
I a knowledge with my signature to accept responsibility for any minor or major offence that I may commit in the future.

Name of student_____ Signature_____
Name of Head teacher_____ Signature_____
Name of parent /Guardian_____ Signature_____

**Awet Ne'hafash!!**

*Appendix 5*

**Samples of cross tabulation of the national exam records**

***Table 1***

School 1, 1997

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 22 | 35 | 57 | 12 | 43 | 55 | 10 | 47 | 57 |
| *M* | 103 | 53 | 156 | 71 | 85 | 156 | 56 | 99 | 155 |
| *Total* | 125 | 88 | 213 | 83 | 128 | 211 | 66 | 146 | 212 |

***Table 2***

School 1, 1998

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 41 | 66 | 107 | 53 | 52 | 105 | 9 | 97 | 106 |
| *M* | 189 | 129 | 318 | 151 | 63 | 214 | 57 | 156 | 213 |
| *Total* | 230 | 195 | 425 | 204 | 115 | 319 | 66 | 253 | 319 |

***Table 3***

School 1, 1999

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 43 | 142 | 185 | 13 | 78 | 91 | 10 | 87 | 97 |
| *M* | 109 | 135 | 244 | 49 | 58 | 107 | 43 | 76 | 119 |
| *Total* | 152 | 277 | 429 | 62 | 136 | 198 | 53 | 163 | 216 |

***Table 4***

School 1, 2000

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 28 | 30 | 58 | 7 | 11 | 18 | 12 | 5 | 17 |
| *M* | 116 | 48 | 164 | 58 | 17 | 75 | 57 | 17 | 74 |
| *Total* | 144 | 78 | 222 | 65 | 28 | 93 | 69 | 22 | 91 |

---

***Table 5***

School 2, 1998

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 10 | 13 | 23 | 7 | 16 | 23 | 5 | 12 | 17 |
| *M* | 46 | 39 | 85 | 56 | 28 | 84 | 13 | 33 | 46 |
| *Total* | 56 | 52 | 108 | 63 | 44 | 107 | 18 | 45 | 63 |

***Table 6***

School 2, 1999

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 2 | 10 | 12 | 4 | 8 | 12 | 1 | 8 | 9 |
| *M* | 16 | 14 | 30 | 12 | 18 | 30 | 9 | 18 | 27 |
| *Total* | 18 | 24 | 42 | 16 | 26 | 42 | 10 | 26 | 36 |

***Table 7***

School 3(a), 1998

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 12 | 7 | 19 | 6 | 2 | 8 | 4 | 3 | 7 |
| *M* | 86 | 14 | 100 | 58 | 5 | 63 | 47 | 15 | 62 |
| *Total* | 98 | 21 | 119 | 64 | 7 | 71 | 51 | 18 | 69 |

***Table 8***

School 3(a),1999

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 25 | 35 | 60 | 14 | 8 | 22 | 11 | 9 | 20 |
| *M* | 129 | 59 | 188 | 66 | 12 | 78 | 54 | 22 | 76 |
| *Total* | 154 | 94 | 248 | 80 | 20 | 100 | 65 | 31 | 96 |

***Table 9***

School 3(b), 1998

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 8 | 8 | 16 | 9 | 1 | 10 | 3 | 5 | 8 |
| *M* | 40 | 10 | 50 | 30 | 4 | 34 | 25 | 8 | 33 |
| *Total* | 48 | 18 | 66 | 39 | 5 | 44 | 28 | 13 | 41 |

***Table 10***

School 3(b), 1999

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 10 | 21 | 31 | 6 | 11 | 17 | 2 | 15 | 17 |
| *M* | 35 | 24 | 59 | 19 | 2 | 21 | 11 | 9 | 20 |
| *Total* | 45 | 45 | 90 | 25 | 13 | 38 | 13 | 24 | 37 |

***Table 11***
School 4, 1997

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | *41* | *38* | *79* | *23* | *40* | *63* | *28* | *59* | *87* |
| *M* | *86* | *49* | *135* | *67* | *53* | *120* | *53* | *79* | *132* |
| *Total* | *127* | *87* | *214* | *90* | *93* | *183* | *81* | *138* | *219* |

***Table 12***
School 4, 1998

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 49 | 49 | 98 | 71 | 14 | 85 | 35 | 48 | 83 |
| *M* | 125 | 91 | 216 | 145 | 14 | 159 | 82 | 74 | 156 |
| *Total* | 174 | 140 | 314 | 216 | 28 | 244 | 117 | 122 | 239 |

**Table 13**
School 4, 1999

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 57 | 150 | 207 | 43 | 115 | 158 | 37 | 103 | 140 |
| *M* | 162 | 125 | 287 | 117 | 95 | 212 | 111 | 83 | 194 |
| *Total* | 219 | 275 | 494 | 160 | 210 | 370 | 148 | 186 | 334 |

***Table 14***
School 4, 2000

| Sex | ***Biology*** | | ***Total*** | ***Chemistry*** | | ***Total*** | ***Physics*** | | ***Total*** |
|---|---|---|---|---|---|---|---|---|---|
| | *Pass* | *Fail* | | *Pass* | *Fail* | | *Pass* | *Fail* | |
| *F* | 76 | 156 | 232 | 29 | 140 | 169 | 38 | 100 | 138 |
| *M* | 142 | 110 | 252 | 66 | 124 | 190 | 79 | 86 | 165 |
| *Total* | 218 | 266 | 484 | 95 | 264 | 359 | 117 | 186 | 303 |

***Source: Asmara testing centre***

*****

The tables above were presented as pass or fail to ease the reading and to indicate the number of candidates who attended the different exams and have passed and/or failed, thus, they do not show the pupils' actual grades. To give a better picture about how many pupils have passed with the different grades, in science subjects in the last three to four years more tables are presented here below. Depending on the number of the correct responses they obtained, candidates are awarded letter grades, namely: A, B, C, D or F. The values given to the letter grades are as the following:

- A = 4 points
- B = 3 points
- C = 2 point
- D = 1 points and
- F = 0

Eritrean schools are composed of pupils who are of mixed gender, mixed academic ability, and mixed economic and parental educational background. Despite the trend of the national picture however, probably because of their better commitment and managerial skills, some schools obtained better results. The schools which obtained better performance are found to have better performing females in science subjects also.

***Table 15***

School 1, 1997

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* |
| *F* | - | - | 1 | 8 | 11 | 37 | 1 | - | - | 1 | 11 | 44 | - | - | 1 | - | 9 | 47 |
| *M* | - | 13 | 22 | 26 | 42 | 53 | 1 | 3 | 7 | 21 | 40 | 84 | 2 | 3 | 6 | 19 | 27 | 99 |

**NB: N *is the number of pupils who chose not to sit for the exams***

***Table 16***

School 1, 1998

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* |
| *F* | 2 | 1 | 2 | 17 | 25 | 61 | 9 | 3 | 5 | 20 | 26 | 45 | 8 | - | 1 | 3 | 7 | 89 |
| *M* | 2 | 7 | 28 | 71 | 81 | 130 | 106 | 11 | 27 | 62 | 50 | 63 | 108 | 2 | 4 | 17 | 32 | 156 |

***Table 17***

School 1, 1999

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* |
| *F* | 1 | - | 8 | 25 | 9 | 148 | 94 | 1 | - | 10 | 4 | 82 | 94 | - | 1 | 5 | 4 | 87 |
| *M* | - | 3 | 26 | 59 | 23 | 140 | 134 | 5 | 18 | 23 | 14 | 57 | 133 | - | 10 | 18 | 14 | 76 |

***Table 18***

School 1, 2000

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* |
| *F* | - | - | 5 | 13 | 10 | 30 | 40 | - | 1 | 5 | 1 | 11 | 35 | - | - | 4 | 7 | 6 |
| *M* | 1 | 17 | 27 | 54 | 19 | 47 | 91 | 2 | 7 | 32 | 14 | 19 | 80 | 5 | 14 | 16 | 22 | 16 |

***Table 19***

School 2,1998

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* |
| *F* | - | - | - | - | 10 | 13 | - | - | 1 | - | 6 | 16 | 6 | - | - | - | 5 | 12 |
| *M* | - | 4 | 3 | 16 | 21 | 41 | 1 | 6 | 5 | 21 | 24 | 28 | 39 | - | - | 4 | 9 | 33 |

*Table 20*

School 2, 1999

| Sex | Biology | | | | | | Chemistry | | | | | | Physics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | A | B | C | D | F | N | A | B | C | D | F | N | A | B | C | D | F |
| F | - | - | - | 1 | 1 | 10 | 1 | - | - | - | 4 | 7 | 3 | - | - | - | 1 | 8 |
| M | - | 2 | 3 | 7 | 4 | 14 | - | 1 | 4 | 4 | 3 | 18 | 3 | 1 | - | 5 | 3 | 18 |

*Table 21*

School 3(a), 1998

| Sex | Biology | | | | | | Chemistry | | | | | | Physics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | A | B | C | D | F | N | A | B | C | D | F | N | A | B | C | D | F |
| F | 1 | 1 | 3 | 3 | 5 | 7 | 11 | - | 2 | 3 | 2 | 2 | 14 | - | - | 3 | - | 3 |
| M | 17 | 25 | 15 | 36 | 11 | 14 | 55 | 20 | 17 | 17 | 4 | 5 | 61 | - | 12 | 21 | 12 | 12 |

*Table 22*

School 3(a), 1999

| Sex | Biology | | | | | | Chemistry | | | | | | Physics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | A | B | C | D | F | N | A | B | C | D | F | N | A | B | C | D | F |
| F | - | - | 5 | 16 | 4 | 35 | 38 | - | 3 | 7 | 4 | 8 | 40 | - | - | 4 | 7 | 9 |
| M | 5 | 9 | 44 | 59 | 17 | 59 | 115 | 6 | 23 | 30 | 7 | 12 | 116 | 1 | 8 | 29 | 17 | 22 |

*Table 23*

School 3(b), 1998

| Sex | Biology | | | | | | Chemistry | | | | | | Physics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | A | B | C | D | F | N | A | B | C | D | F | N | A | B | C | D | F |
| F | - | - | - | 3 | 5 | 8 | 6 | - | - | 4 | 5 | 1 | 8 | - | - | - | 4 | 4 |
| M | - | 10 | 9 | 18 | 3 | 10 | 16 | 12 | 7 | 8 | 3 | 4 | 17 | - | 5 | 12 | 7 | 9 |

*Table 24*

School 3(b), 1999

| Sex | Biology | | | | | | Chemistry | | | | | | Physics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | A | B | C | D | F | N | A | B | C | D | F | N | A | B | C | D | F |
| F | - | - | 1 | 8 | 3 | 20 | 17 | - | 1 | 1 | 3 | 10 | 18 | - | - | 1 | - | 13 |
| M | 4 | 1 | 16 | 13 | 7 | 23 | 39 | 3 | 7 | 9 | 3 | 3 | 39 | - | 1 | 11 | 3 | 10 |

*Table 25*

School 4, 1997

| Sex | Biology | | | | | | Chemistry | | | | | | Physics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | A | B | C | D | F | N | A | B | C | D | F | N | A | B | C | D | F |
| F | 5 | 2 | 5 | 16 | 18 | 38 | 23 | - | - | 9 | 15 | 37 | 25 | - | - | 8 | 17 | 34 |
| M | 39 | 16 | 13 | 33 | 26 | 50 | 61 | - | 10 | 25 | 26 | 55 | 67 | 5 | 6 | 19 | 18 | 62 |

*Table 26*

School 4, 1998

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | A | B | C | D | F | N | A | B | C | D | F | N | A | B | C | D | F |
| *F* | 5 | 5 | 10 | 11 | 25 | 46 | 17 | 13 | 8 | 27 | 23 | 14 | 17 | - | 6 | 15 | 17 | 47 |
| *M* | 37 | 14 | 22 | 51 | 34 | 88 | 87 | 18 | 23 | 60 | 44 | 14 | 85 | 1 | 7 | 43 | 36 | 74 |

*Table 27*

School 4,1999

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* |
| *F* | 3 | 2 | 7 | 31 | 19 | 146 | 47 | 3 | 7 | 20 | 14 | 117 | 68 | - | 3 | 22 | 15 | 100 |
| *M* | 10 | 8 | 33 | 78 | 41 | 129 | 88 | 13 | 40 | 50 | 15 | 93 | 111 | 2 | 19 | 44 | 27 | 96 |

*Table 28*

School 4, 2000

| *Sex* | *Biology* | | | | | | *Chemistry* | | | | | | *Physics* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* | *N* | *A* | *B* | *C* | *D* | *F* |
| *F* | 3 | 5 | 10 | 25 | 39 | 155 | 54 | - | 1 | 12 | 17 | 153 | 92 | - | 1 | 13 | 29 | 102 |
| *M* | 7 | 16 | 28 | 57 | 39 | 109 | 80 | 2 | 7 | 35 | 20 | 112 | 93 | 5 | 11 | 25 | 37 | 85 |

***Source: Asmara Testing Centre***

These tables indicate that a smaller number of candidates obtained A or B grades, on the contrary a much larger number of the candidates obtained C, D or F grades in most subjects. Moreover, these records show that different subjects had different number of candidates attending them, the reason for this is because students have the choice for which exams to sit. Secondary school pupils as long as they fulfil the requirement of their majors, they have the freedom to choose the exams they wish to sit for. Because of that, pupils usually choose the subjects they are good at. Hence, depending on the degree of complexity of the subject, the number of participants will vary. The more the subject is thought to be difficult, e.g. physics, the less it will be attended, conversely the more a subject is believed to be achievable, e.g. biology, the more it will be selected by the candidates.

## *Letter grades of female candidates from central administrative zones, by year*

***B.***

| | 1998 | | | | | | 1999 | | | | | | 2000 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | F | N* | A | B | C | D | F | N* | A | B | C | D | F | N* |
| Phy | 0 | 4 | 14 | 16 | 85 | 39 | 0 | 3 | 23 | 14 | 105 | 60 | 0 | 1 | 13 | 25 | 105 | 90 |
| Bio | 3 | 13 | 10 | 27 | 105 | 2 | 2 | 5 | 29 | 20 | 146 | 2 | 5 | 11 | 25 | 39 | 157 | 3 |
| Che | 13 | 8 | 28 | 28 | 47 | 33 | 3 | 7 | 15 | 18 | 117 | 44 | 0 | 1 | 13 | 18 | 152 | 54 |

***D.***

| | 1998 | | | | | | 1999 | | | | | | 2000 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | F | N | A | B | C | D | F | N* | A | B | C | D | F | N* |
| Phy | 1 | 2 | 11 | 15 | 26 | 25 | 0 | 1 | 9 | 5 | 41 | 41 | 3 | 2 | 15 | 12 | 37 | 52 |
| Bio | 7 | 8 | 26 | 15 | 29 | 0 | 0 | 9 | 27 | 10 | 50 | 1 | 5 | 15 | 33 | 24 | 43 | 50 |
| Che | 7 | 11 | 21 | 9 | 10 | 24 | 4 | 2 | 18 | 12 | 21 | 40 | 1 | 2 | 16 | 14 | 36 | 50 |

***I. S.***

| | 1998 | | | | | | 1999 | | | | | | 2000 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | F | N* | A | B | C | D | F | N* | A | B | C | D | F | N* |
| Phy | 1 | 2 | 5 | 5 | 50 | 21 | 0 | 0 | 4 | 7 | 74 | 33 | 0 | 2 | 4 | 8 | 48 | 17 |
| Bio | 1 | 6 | 16 | 13 | 47 | 0 | 0 | 1 | 11 | 15 | 90 | 0 | 2 | 1 | 8 | 13 | 55 | 0 |
| Che | 6 | 4 | 17 | 8 | 31 | 18 | 0 | 1 | 11 | 7 | 65 | 33 | 0 | 0 | 3 | 11 | 47 | 17 |

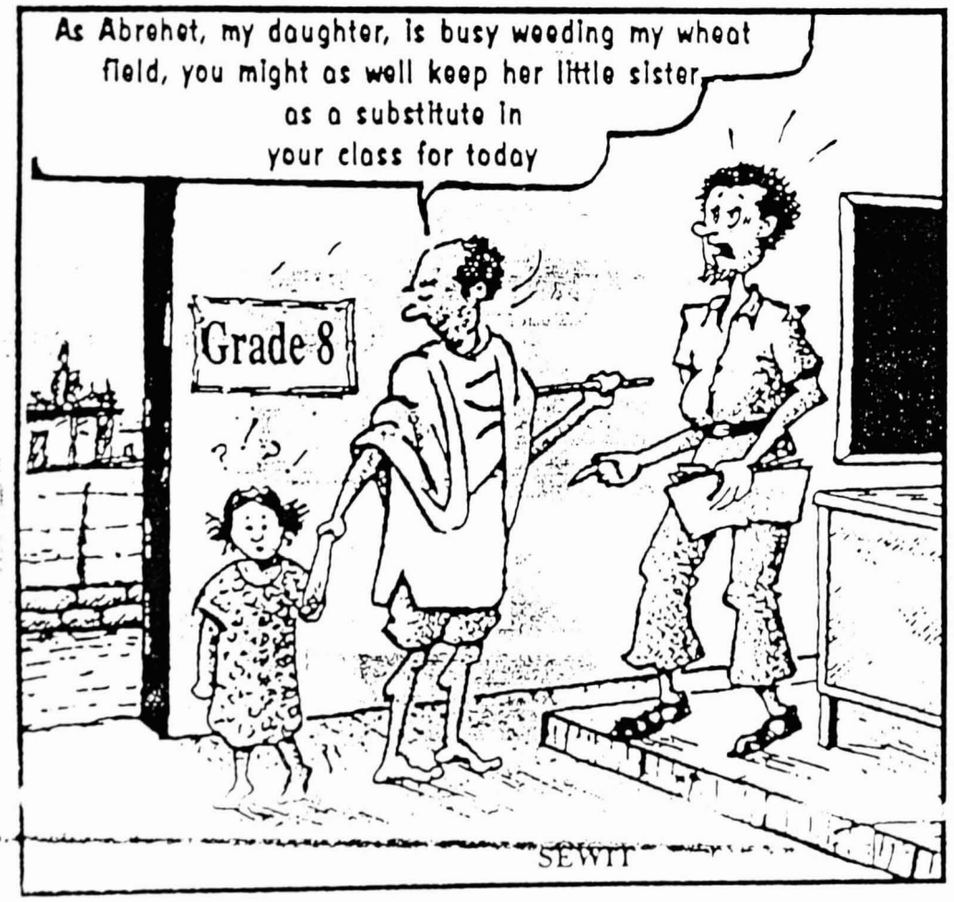
***I. T.***

| | 1998 | | | | | | 1999 | | | | | | 2000 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | F | N* | A | B | C | D | F | N* | A | B | C | D | F | N* |
| Phy | 0 | 0 | 7 | 7 | 43 | 55 | 0 | 0 | 5 | 4 | 61 | 25 | 0 | 0 | 5 | 13 | 60 | 57 |
| Bio | 0 | 4 | 8 | 11 | 82 | 4 | 0 | 1 | 7 | 3 | 84 | 0 | 2 | 7 | 12 | 17 | 88 | 9 |
| Che | 1 | 2 | 20 | 12 | 51 | 26 | 0 | 1 | 6 | 5 | 58 | 25 | 0 | 1 | 8 | 15 | 93 | 18 |

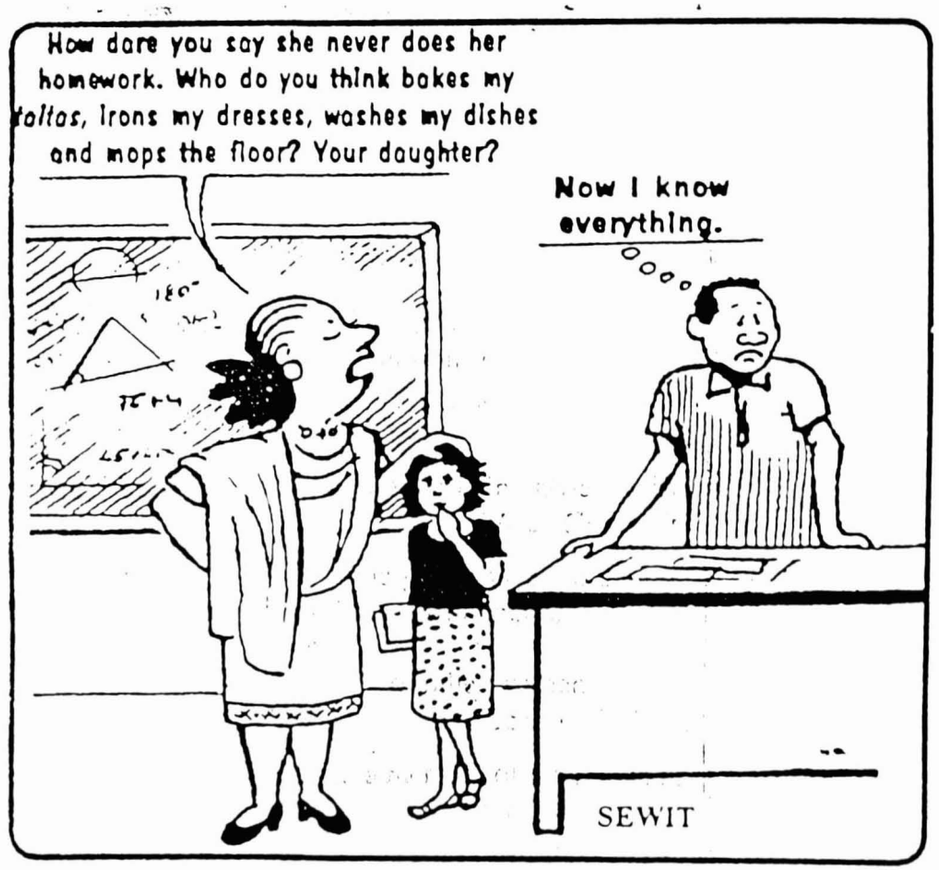
***Sm.***

| | 1998 | | | | | | 1999 | | | | | | 2000 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | F | N* | A | B | C | D | F | N* | A | B | C | D | F | N* |
| Phy | 1 | 3 | 13 | 12 | 43 | 22 | 0 | 3 | 15 | 17 | 81 | 43 | 0 | 3 | 8 | 15 | 86 | 42 |
| Bio | 3 | 3 | 10 | 14 | 60 | 4 | 5 | 3 | 20 | 20 | 110 | 2 | 6 | 8 | 21 | 23 | 96 | 0 |
| Che | 9 | 11 | 21 | 16 | 18 | 21 | 3 | 4 | 26 | 15 | 75 | 34 | 0 | 3 | 15 | 15 | 87 | 34 |

N*: *the number of pupils who could choose the subject but they did not*




Eritrea Profile March 8, 1997




Eritrea Profile April 12, 1997

APPENDIX 6

*have fathers with at least secondary school education and almost 40% have fathers with at least some college education. In contrast, more than 60% of the males have fathers with less than secondary education, and fewer than 20% of the males have fathers with some college education.*

To find out whether the situation for these students were the same they were asked to share details about their parental educational level for which they gave the following responses.

## 2.1 Parental education

***Table 4 & 5***

| ***Level of education*** | ***Paternal*** *educational level* | |
|---|---|---|
| | ***Female*** | ***Male*** |
| *No formal education* | 3<br>20% | 5<br>29% |
| *Elementary education* | 3<br>20% | 4<br>23% |
| *Secondary education* | 3<br>20% | 2<br>12% |
| *Secondary education & above* | 6<br>40% | 6<br>35% |

| ***Level of education*** | ***Maternal*** *educational level* | |
|---|---|---|
| | ***Female*** | ***Male*** |
| *No formal education* | 5<br>33% | 9<br>53% |
| *Elementary education* | 6<br>40% | 3<br>18% |
| *Secondary education* | 2<br>13% | 1<br>0.05% |
| *Secondary education & above* | 2<br>13% | 3<br>17% |

As expected, like the secondary school pupils, a large number of fathers had secondary education and above. However, a larger number of the mothers had little or no formal education. The contrast between paternal and maternal education is startling. Although these differences were found to be common among all mothers irrespective of the gender of the student, it was interesting to discover the degree of disparity between the educational level of girls' fathers as opposed to the boys' mothers. Despite the unusually low maternal formal education, an overwhelming majority of the student population in the country was found to be males and the reason being that maternal education is immaterial to the child's chances for education, especially if that child is a male. These remarkable findings may activate questions as to how despite the low maternal educational level these boys were able to reach university level, since about 90% of the university student population are males (see Needs assessment of female....

their teachers' dedication and commitment in helping them to attain good results in their secondary education, (Eritrea Profile Sept. 13, 1997), the large class sizes and the number of shifts, meant that secondary school teachers could not give enough support to their students, to succeed in the ESECE. ESECE are the bottleneck to the pupils' success, if students pass these exams successfully they have more chances of achieving what follows next.

As indicated in chapter five, Eritrean secondary school examinations in general consist of multiple choice questions and numerous studies have identified a tendency for boys to do better when the responses required in examinations are right/wrong or short answers, whereas girls do better when responses involve extended writing. Structured responses create 'barriers' to students whose preferred response do not fit the 'frame' supplied, (Salisbury 1999: 407). According to this account, girls typically find difficulties with a tightly structured response, whilst boys find lack of structure problematic.

**2.2 Study time**

As some subjects are perceived to be more difficult than others, it is expected that students spend more time studying those they think are difficult. Accordingly, participants were asked to state the average time they spend on studying the different science subjects (biology, chemistry and physics). In response to the question, 53% said they spent most of their time on studying physics, 31% said they spent their time on studying either biology or chemistry and 16% said they gave equal attention to all subjects.

In answering the question why they spent more time on one subject rather than on another, they came up with a variety of reasons some of which are listed here below.

- *I like calculation and because the exams in matric are harder in physics, so I spend a lot of time doing calculations.*
- *My favourite subjects are physics and maths because I had very good teachers who encouraged me to study.*
- *Physics, because I was not good at it, I needed to give it a lot of time to it.*
- *There were several college physics books in our house and I felt motivated to study the subject.*
- *Physics and chemistry, because they are abstract subjects and difficult to understand and because I like working with formulas and calculations.*
- *I got satisfaction in solving problems in physics and thought that physics graduates had a brighter future.*

understand the Indian teachers' English pronunciation, pupils said these teachers displayed a rather negative attitude and this created some kind of antagonism between the students and the teachers.

Given the consistent achievement disparity between Eritrean boys and girls in secondary schools, participants were asked to state if they thought that males and females were intellectually different from each other. Most of the respondents said that they were not different and they gave the following reasons for their different attainments. These points include:

- *Girls are not encouraged enough & do not take enough time to study their subjects*
- *Parents expect girls to do the house chores instead of studying*
- *Girls are careless, they do not worry about their education, they mostly worry about their future (married) life*
- *Some pupils, especially girls, lose hope and decrease their effort of studying their subjects.*

From the pupils' responses, it is possible to understand that most of the participants, particularly girls, have tried to give positive views in the questionnaires by trying to be as moderate as they possibly could in their claims. Thus they appeared to have little or no problems with their schools or with their teachers. In the interviews and in the informal interaction, on the other hand, most of them demonstrated rather negative views about their schools in general, about their Indian teachers in particular. Moreover, in the questionnaires, pupils' views in regard to science subjects emerged easy, conversely, in the interviews, science subjects come forth as difficult.

## *8. Concluding remarks*

This chapter started with exploring the views of the pupils, collected by means of questionnaires completed by the pupils and interviews conducted by the researcher. The data was collected from six Eritrean secondary schools. Pupils' questions in this chapter were designed to test some assertion of the Eritrean society, that boys and girls have different attitudes and values and that girls lacked ambition.

Therefore, the finding in this chapter is based on the view of Eritrean $10^{th}$ and $11^{th}$ grade pupils and the issues discussed were: the participants' home environment, their parental, educational level, parental employment and involvement in their children's education. It further discussed the pupils' educational and occupational aspirations, their school

## *CHAPTER SIX*

## *1. ANALYSIS OF UNIVERSITY STUDENTS PERCEPTION*

### 1.1 Introduction

This chapter is an analysis of the university students' questionnaire responses and it covers general information about the participants' views about their secondary school science subjects, gender and learning and the ESECE (national exams, as they prefer to call it). Many of the questions in the chapter were the same as those in chapter five and the reason for that is to compare and contrast the views of the pupils with these participants. However, to avoid repetition of ideas, if the responses are the same, they will be commented on less than if they were different.

32 students from the Faculty of Education (department of secondary school teachers) participated in this study. Secondary School teachers' department comprises social and natural science branches and the students who participated in the study were 15 females and 17 males (randomly selected) from the different natural science (education) departments. As the tables will indicate, the participants were in second, third and fourth years of their studies and were representative of all the university student population in terms of their home background. They were from all over the country including one from Ethiopia.

These students were included because it was felt that:

- *they could still remember many things about their secondary schools and add valuable contribution to the study,*
- *could give more reflected answers that the secondary schools pupils probably would not,*
- *they could give more objective, reflected and critical responses than the secondary school pupils, and*
- *they could give advice to those who are still in the secondary schools (on how to succeed in their studies).*

and Eritrea Profile Sept. 5, 1998). This being the case, there was no problem finding male students to participate in this study; however, it was a problem finding enough girls from the same year and in the same department. Therefore, although the original plan was to deal with second year university students, it was changed to include 3rd and 4th year students to secure enough number of girls' participation.

Parental occupational status and their educational attainment were found to be important factors for students' success in studies by (Robinson 1993) and (Kutnick 2000). Moreover, according to (Swainson 1995: 21), a survey of teachers, university students and secondary school pupils in Ghana, which looked at the educational background of parents and students, illustrated graphically the multiplier effect of female education. In that study female students who had mothers with higher levels of education, were themselves given opportunities and funding to promote their own education to higher levels.

Although any child of highly educated parents may have better chances of succeeding in education, often the issue of parental education is not so important in the case of boys. The general notion of Eritrean society is that boys' future life depends on their education, thus they are offered better possibilities to study as opposed to girls, irrespective of the educational level of the parents. The assumption for the majority of girls who were at the university, on the other hand, is due to their parental educational level and the degree of encouragement and help received at home.

My assumption is that many of the university students (males and females) had family members who before them attended university education, and as a consequence they were encouraged to follow their footsteps. To find out if this assumption was correct, these participants were asked to state if they had any family member who had attained a university degree or was a university student at the time of the study. As expected a big percent (70% males and 53% females) replied to this question positively.

Another widely held assumption is that better educated family members either gave academic assistance to their offspring or paid some one to do the job for them. With this in mind participants were asked to state if they received any academic assistance at home. Here too, as expected, a high percent, i.e. (76% male and 73% female) students indicated that they were assisted at home. Although some students were grateful for

- *My elder brother who was in Addis Abeba, encouraged me to study hard and tried to tell me to get to the University. He always wrote to me saying the same thing and sent me money to buy books. (girl)*

- *My father used to help me in subjects such as Maths and English by bringing books etc. and he used to promise to buy me a bicycle, a nice pair of shoes etc. if I stood first in class. (boy)*

- *My parents asked me if I had any problem with my studies to help solve it and suggested what books were good for me to read. (boy)*

- *My parents gave me moral support as well as all the necessary material for learning and in my final year they hired me a teacher to help me revise all the notes of the lower grades. (boy)*

- *My father used to tell me that my future depended on how successful I was in my studies, so he encouraged me to work hard. He helped me with the solution of some problems, and with the introduction of a private teacher. I was a member of three libraries; besides my father bought me biology, chemistry and physics books. (boy)*

- *They encouraged me in many different ways, e.g. they tried to explain the unclear concepts and paid for some tutorial hours. (boy)*

The responses of the boys and girls are very interesting considering they told different stories. Most Eritrean parents (in the questionnaires and interviews) claim to offer equal help to all their children, but even though they may do this in good faith, the kind of help they give to their sons and daughters are very different and un-equal. Since most girls are made to work at home, as the two girls above have indicated, the maximum help their parents offered them were to free them from doing the house chores and possibly gave them the freedom to choose places where they liked to study. Boys, on the other hand, did not talk of the issues of time and space for studying since they are considered as their 'divine rights'.

Girls may receive moral support and the few lucky ones, as the two girls above have indicated, may be set free from the house chores and possibly have the freedom to choose a place where to study, i.e. in the libraries or maybe at friends' houses. However, they were not provided with any special learning material nor were they given any academic help, as were their brothers. Boys on the other hand, possibly because they were expected to succeed, had no restriction of time or space for their studies. Moreover, as evidence in their responses indicate, they were assisted academically by either their fathers or by some hired tutors. Besides, they were supplied with different learning tools. Or as one of the participants indicated, to motivate his achievement, he

Probably because my expectation of the teachers was un-realistic, I was overwhelmed to obtain such responses from the pupils in their regard. The offences pupils commit are usually minor, which may include, talking in class, while the teacher is explaining, coming late to school, failing to complete their homework assignment. coming to school without uniforms, or having arguments between themselves. I personally would not consider these offences as deserving major punishment in any way, but to find out that teachers punish the pupils the ways they do and above all to treat boys and girls so differently in ways these students have presented, disturbed me. I feel that the job of a teacher is to teach and form the youth with examples and appropriate behavior, but if a teacher treats pupils with too little respect, he/she defeats the cause of his/her profession. Pupils cannot learn anything good from a teacher who humiliates his/her learners either with the use of verbal insult or any type of physical punishment as indicated above.

### 4.4 Eritrean society's attitude

A number of studies, e.g. (Harding 1992), have shown that parents generally expect less of their daughters than of their sons, particularly in mathematics and science, but (Kelly 1982) and (Riddell 1992) reported that parents had higher expectations of their daughters than of their sons. However, the assumption is that Eritrean society has higher expectation of their sons than of their daughters, and thus gives them different treatment. To find out the opinions of the participants, on these points a question: *Does Eritrean society, encourage boys and girls to equally achieve good results in secondary education?* was asked. The responses of both boys and girls were very similar in that, with the exception of one boy and one girl who responded positively, all 30 said that the society did not treat boys and girls the same way. Their views are presented here below.

- *Society does nothing to encourage girls to achieve in higher education, instead it discourages them by giving them difficult tasks in the house and by asking them to carry the burden of caring for children and elderly members of the family.*

- *Society discourages girls' learning by saying that it is enough if they know how to read and write because they can't use much of their education in their daily lives.*

- *Girls are married at an early age (in their teens), and their parents as well as society expect them to have babies.*

Moreover, they added, if at all girls complete higher education they are only expected to be; secretaries, cashiers, accountants, etc. What seems ironic is that if a girl says she would like to be a professor, scientist, archaeologist, engineer, etc. she is laughed at by

## 4.2 Achievement disparity

Unlike those in Eritrea, girls in the UK are achieving better than boys do. According to Salisbury et al. (1999: 404), in terms of standard assessments and examination results, girls are generally attaining higher grades than boys. This difference in attainment and the gender gap is growing over time. (Salisbury et al. 1999) point out that there is under-performance by boys and the greatest concern has been expressed about failing boys, or boys at every low levels of attainment. In opposition to the findings above, my concern is about girls' underachievement in Eritrean secondary schools. To obtain the participants' perception on the issue in discussion they were asked: a) to state if they noted achievement disparity in their science classes and b) if their answers were "yes", to state what the causes for the disparity were. The question and responses follow:

***Table 6***

***Was there any achievement disparity between boys and girls in your science classes?***

| | *Female* | *Male* |
|---|---|---|
| ***Yes*** | *8*<br>*53%* | *10*<br>*58%* |
| ***No*** | *5*<br>*33%* | *3*<br>*17%* |
| ***Missed the question*** | *2*<br>*13%* | *4*<br>*23%* |

As can be observed, more than half of the participants said there was disparity and the reasons for such disparity were many, however, some of those mentioned in their responses are listed below:

- *parents disrupt girls education by marrying them off at an early age,*
- *girls feel obliged to help their families,*
- *girls are not allowed to study in quiet places e.g. in the libraries,*
- *neither the society nor the teachers expect them to achieve high standards in their studies and girls internalise these expectations and study less,*
- *science requires a lot of time to master but girls don't have enough time to study it,*
- *girls lack female scientists as mentors and role models.*

Moreover, some participants pointed out that girls' positions do not help them to think in terms of science. Because they usually interact with their mothers more than they would with any other member in the family, they may be hindered from sharing their science learning since most mothers have no formal education and could not understand the girls' argument about science.

Over all, what hinders girls' achievement in school is, like many working women, they are expected to combine their additional role in the home with their studies. This means

that girls are required to spend more time than boys helping at home leaving less time for their studies. According to post-structuralists, (Davies 1989), (Walkerdine 1981) and (Davies and Banks 1992), there are various and contradictory discourses of feminine subjects with a range of ways in which girls can be girls in educational settings. Being a girl, then, takes on various possible meanings, which shift within discoursive context or within different sets of taken for granted meanings.

For example, a newly admitted female university student, Aziza Seid, stated that:

> *Most female students are not encouraged by their parents for the culture of our society limits women to an early marriage only, in addition to this they are burdened with household chores so that they could not study freely,(sic)* (Eritrea Profile, Sept. 13, 1997).

As this quotation and the views discussed above suggest, parental attitudes towards education of their children are clearly key factors to their success or failure since they often influence how well a child will do in school. Overall parents attitudes may reflect those of the society at large, which are deeply embedded in prevailing cultural norms and values. As pointed out in chapter two, (Ashcroft 1996) students learn better if they feel empowered and valued; however, teachers' and society's low expectations of them impede them from achieving good results. I feel that Eritrean society is a classic example for all these theories, in that it does not encourage girls to achieve good results, but yet expects them to perform as well as the boys. The debates up to this point have been about the effect of the home environment on the learners but the subsequent points will take us to see the effects of school discipline problems on the learners.

### 4.3 School discipline problems

Researchers suggest that pupils are often acutely aware of the ways in which teachers relate to them both as individuals and as members of groups. Pupils perceive that teachers respond very differently to girls and boys, not simply in their classroom management responses, but also in terms of questioning and teacher attitude. Clearly pupils learn the informal curriculum via these interactions, which can contribute to their own sense of studentship, (Salisbury et al. 1999: 409). Furthermore, it has been suggested that teacher expectations and perceptions of pupils' motivation influence patterns of classroom management and the interactions between teachers and pupils. Teachers' attitudes and expectations may also feel sex-stereotyped attitudes to certain subjects, (Archer 1992) & (Riddell 1992). In the light of the above arguments, participants in this study were asked to state if there were major discipline problems and

Moreover, the examples and applications teachers use, according to (Woolnough 1994: 25), in the UK tend to concentrate on topics which interest boys much more than girls. The impersonal and mechanistic approach of physical science may be off-putting to girls, who tend to be more interested in people than in things. Next, science problems are often phrased in abstract and passive terms, having no apparent connection with situations that are meaningful to pupils. Moreover, literature indicates that boys seem to enjoy competitive individualistic work, whereas girls seem to prefer a more relaxed and co-operative atmosphere.

With similar thoughts to the above, (Murphy 1997: 124), found out that, at age 10, the results showed very similar performance by boys and girls, with girls performing at a higher level than boys on the investigating components. In the older age, boys were slightly ahead of girls in Japan and Singapore and the opposite was the case in Israel. Furthermore, it was noted how children's play led them to develop different attitudes towards different subjects. Girls across the ages were found to confidently out perform boys on the practical tests of making interpretative observations. It was not the case that girls' performance was higher than boys in all tasks, indeed, this revealed that girls more than boys, took note of colours, sounds, smells and texture. Boys on the other hand, took note of structural details. Thus, when asked to observe similar phenomena of objects and events in an open way, girls and boys paid attention to different details. However, in my findings, neither the teachers nor the students seem to have noted any difference in the learning styles between male and female students. They said that different pupils develop different learning styles but they could not attribute any special learning style to the gender of the learners.

### *4.1.2 Gender and Achievement*

In this study, the lack of girls' achievement in science was attributed to the traditional values, attitudes and resistance to changes. The findings focused mostly on the lack of motivation for girls to achieve good results and lack of enough time to do their schoolwork. Participants in this study, especially the women and the younger generation males have demonstrated more radical views towards equality than men; in which they seem to be aware of the injustice girls suffered. However, they did not try to challenge the traditional patterns; they sympathised with the girls, but accepted the situation as norm.

My educational experience is rather unusual, because I was continuously moving from one school type to another, as I will explain here. I attended elementary education in co-educational (co-ed) schools (in Sesah and Ala), then I entered a single-sex school (Comboni Girls) for junior and partly senior secondary education, from where I was transferred to a male school (Holy Saviour Seminary) to complete my secondary education. Following this I went to an all Women College (Notre Dame, in Cleveland Ohio, USA) for undergraduate studies and last I studied at a co-ed university (La Salle University in Philadelphia, PA, USA), for my graduate studies.

As I reflect back about my experiences retroactively, I remember the degree of my participation in the classroom and my grades were changing with each situation. When I was in co-ed schools, I was an average pupil, but when I moved to an all-female school, I felt comfortable among my peers, the social life was good but above all my academic performance was very good. However, when I was placed in an exclusive male school, I felt that both my social and academic life were affected negatively. In the all male secondary school, I became sensitive to the remarks made both by the male-teachers and my classmates, I felt uncomfortable in the environment and participated less in class but above all I saw deterioration in my academic performance. Hence based on my experience and my reading, I suggest that Eritrean secondary school girls would not behave the way they do if they were to find themselves in different learning atmospheres. I am aware that it is unfair to blame the male school in my case and the co-ed schools in the case of these girls' every plight. Moreover, I am also aware that I am only quoting my personal experience; however. I feel that this may be food for thought.

As was pointed out in the literature review, co-ed secondary schools, which are dominated by male pupils and male teachers, do not encourage girls' active participation; hence, it may be partly responsible for the Eritrean girls' low academic achievement. Therefore, my conclusion is that if girls in this study play shy in their secondary schools, it is probably because; a) they do not feel too comfortable to share their views, due to social pressure, b) no room is left for them to say any thing, since classroom activities are dominated by male teachers interacting with male pupils. Evidence indicates that there are more boys in every secondary science class and more than 90% of those who teach science subjects are males, therefore girls feel over

powered in participating actively. Up to this point we have seen in general the students' classroom activities and now we will move on to see their learning styles.

### 4.1 Learning styles

One of the strands of the feminist argument is that schooling is part of a process by which the ideas and experiences of girls are trivialised by males. Furthermore, it has been argued that there are characteristic learning styles and problem solving approaches for boys and girls which, depending on circumstances, can both elevate and depress pupils' performance; (Murphy 1989) and (Head 1996). To draw students' inference concerning the different learning styles, participants were asked to share if they noted *different learning styles between boys and girls*. Over all, both sexes in this chapter, and participants in chapter five, said they were unaware of any different learning styles between males and females. But most of them, i.e. 67%, agreed that there is not much choice left for girls to develop any learning styles, since they have to work around their domestic schedules. They said if girls really want to learn they must do it at night, when all the house chores were done. Is it a great wonder that these girls find the energy to study at night after long working days.

Even though some of the participants did not respond directly to the question asked, here are some of their views.

> *Boys prefer to study with their peers, but girls do not participate in class actively. (girl)*
>
> *Girls prefer to study at home using the access at hand, but boys prefer to go out to the libraries and study with their friends. (boy)*
>
> *Boys like to learn through trial and error, discussing it with their friends. Girls, on the other hand, take pleasure from the familiar work creating a stage of participation and having the attention of teachers and their peers. (girl)*
>
> *Boys concentrate on mathematical and scientific subjects, while girls emphasise social science, such as history or English. (boy)*
>
> *There are different styles of learning because of the individual's choice, but not because of the learner's gender. (boy)*

As students have pointed out, boys and girls have different preferences in their learning styles, i.e. boys prefer to go out and discuss subjects with their peers and in the process they clarify unclear points and possibly share the knowledge with each other. Here is one example of peer learning indicated by a boy (Tesfay Emba) whose GPA was 4.0 and admitted to the University of Asmara.